

# **Training Resources in the Rochester Area of Potential Use to the Photonics, Optics and Imaging Sector**

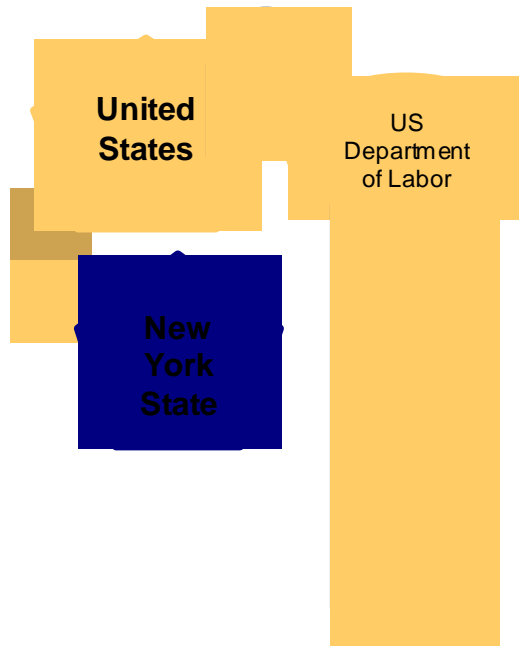
Fragmentation of the workforce development system, with its corollary of redundant programming and low efficiency due to poor coordination was a persistent criticism of the Job Training Partnership Act model, and a major goal of the Workforce Investment Act was to effect systems reform. In exploratory research, I attempted to identify the currently available local training resources potentially useful to the Photonics, Optics and Imaging sector, and determine their sources of funding if possible. I have identified a number of specific programs, and have also attempted to understand the flow of governmental funds and other public resources through the system. It has been extremely difficult to obtain specific information about both funding arrangements and program utilization. While professing a willingness to cooperate, none of the CareerBridge agencies, nor any of the academic or private-sector training programs, were forthcoming with specific program statistics or program grant funding budgets.

In the absence of hard information on money flows in support of training, I attempted to depict the resource relationships, as I was growing to understand them, in the form of schematic graphical images. The development of these graphical elements are intended to serve as the basis for future research with stakeholders, who will correct and refine the relationships expressed through focus group or workshop interactions. An understanding of the resources flowing from the public sector can serve as the basis for the design of inputs from the private and nonprofit sectors that complete a workable and efficient whole in support of one of the areas' greatest core competencies.

The schematic images are best presented in stages, then combining the sub-systems to show the entire workforce development system, as viewed from the Workforce Investment Board-led perspective. The governments involved in the Rochester Workforce Development System are depicted in this schematic (see figure 1) by pentagons of different colors. The arrows of matching color coming out of the pentagons represent the streams of funding originating with each of the levels of government. In the case of the federal government, most funding is channeled through the State, although some is made directly available to localities through grants-in-aid provided by US DOL (such as the Community Audit grant, which is depicted as helping to fund the development of "brokers" or intermediaries). The government agencies are depicted as ovals, with arrows from their governmental unit representing funding flows in this series of schematics. To aid clarity, only those agencies being focused on as major resource sources are shown, although the nature of program fragmentation is such that a dizzying complexity would appear if all public sector program sponsors were shown.

Figure 1 shows the basic policy of the Workforce Investment Act: while some funds continue to flow to the federal agency (Department of Labor), which sponsors competitive grant programs for localities to promote workforce development, the major funding stream flows through the States.

**Figure 1.**

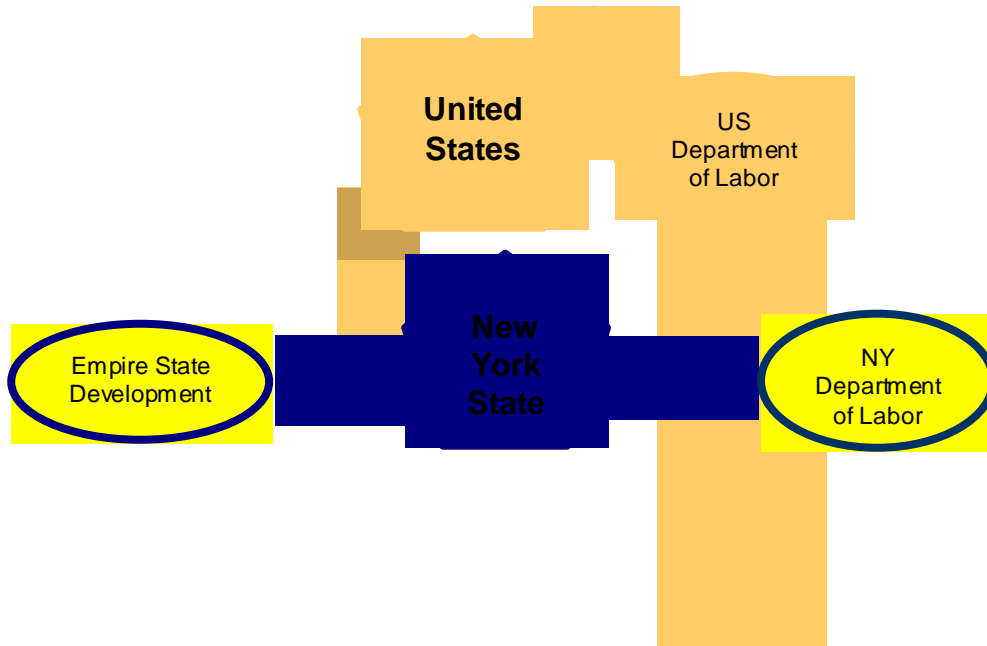


There are a number of training programs locally connected to this group of WIA governmental funding sources. There are also a number of training programs, as well as research and development/education endeavors, funded through other funding streams that are more focused on economic development or education goals than job training, per se. These education and economic development funding streams have some federal support, although most of the policy and funding originates at the state level. The education funding stream is so complex that it has not been included in the schematics being presented here, in the interest of clarity. Most of the funds for community colleges, BOCES and 4-year colleges and universities are obtained via these funding streams (and tuition). There are, however, minor sources of funds that are distributed to these organizations through the economic development and job training governmental funding streams, either directly, or, through eligible employers or groups of employers contracting for services. These funding streams are important to consider, as they are intended to serve as incentives to encourage the involvement of academic institutions in workforce training systems. Whether those incentives are sufficient to gain effective involvement in the workforce development system, in consideration of the conflicting goals that are associated with the incentives available through the economic development and education funding streams, is a question to keep in mind.

The funding for local job training programs from New York State comes predominantly through two separate agencies, then, Empire State Development and the

Department of Labor. Only one program was found that is jointly administered through both agencies, the Strategic Training Alliance Program (see Appendix A for details). Figure 2 shows this relationship:

Figure 2.



Of course, the economic development funding stream has federal sources, too, although they are complex, with several agencies and bureaus operating programs, and economic development often being only one of a group of program goals. These programs are sometimes less clearly delineated in law than the Workforce Investment Act funding stream, and may be subject to more project earmarking. Here, we must briefly consider direct federal funding for research and development that produces advanced technical training as an important by-product. State-level economic development agencies are not generally the primary participants in such endeavors, although they may provide some small percentage of funding in support. Research institutions, or consortia of industry, academic institutions and professional organizations, are the local recipients of these federal funds.

New York State also earmarks particular economic development projects, and training components may be a part of the activity encouraged through earmarked funding mechanisms. However, the primary conduit for aid to firms to train their workforce is through Empire State Development. Under the title “We Can Train Your Workforce,” Empire State Development states the following on their web site

New York State offers training assistance to small and large businesses attempting to meet the challenge of creating new products, entering new markets and improving production. Our professionals will help bring your business's workforce up to the highest standards -- knowing that today's competitive world requires skills that work effectively in an increasingly complex, information-intensive environment. We can also help you

with new hires to ensure that they receive the training needed to work effectively in your business environment.

**We Can Provide:**

Up to half the cost of any training project that creates or retains jobs.  
Training in new technologies, new skills or new work processes.  
Classroom or on-the-job training.

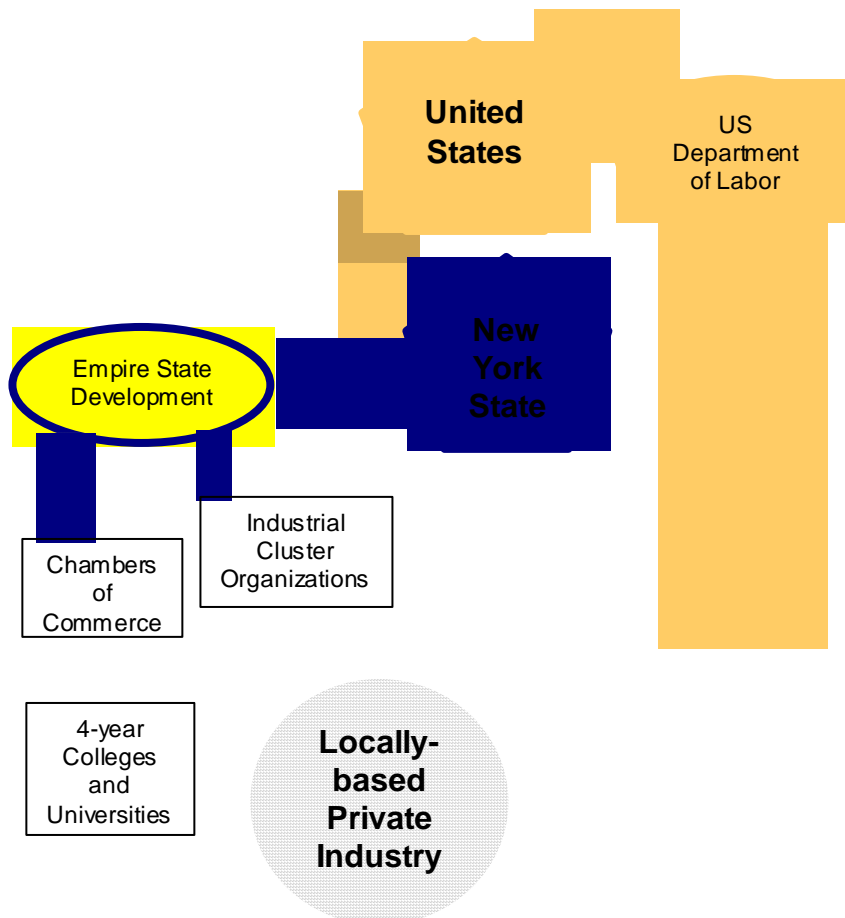
**We Can Assist:**

Employers in the manufacturing and non-retail service sectors, either directly or through industry groups or associations, alliances of employers, government agencies, not-for-profit private industry councils, or workforce investment boards.

([http://www.empire.state.ny.us/serv\\_training.html](http://www.empire.state.ny.us/serv_training.html) )

Empire State Development (ESD) has regional offices throughout the state, as well as offices in Albany. In addition, funds from this stream that are awarded to academic institutions are funneled through a state-level sub-agency, the New York State Office for Science, Technology and Research (NYSTAR). To show the economic development funding stream, the following schematic (figure 3) highlights the New York State funding available through Empire State Development. The local programs funded by the economic development stream typically do not access WIA funds directly to help carry out ESD-funded workforce development programs. Local firms may access these funds indirectly, through the local Workforce Investment Board, while simultaneously making use of non-WIA, direct ESD funding sources at the state and regional level.

**Figure 3.**



The four-year academic institutions that receive ESD funding for research-based economic development are involved with a centralized intermediary agency, New York State Office for Science, Technology and Academic Research (NYSTAR). The project funding relationships are complex, and often include business partners. For that reason, NYSTAR and its programs are not included in the schematic (figure 3); however, the lack of a direct funding arrow between “Empire State Development” and “4-year Colleges and Universities,” and the proximity of “Locally-based Private Industry” is intended to express this complex partnership. Typically, these funding arrangements include research and development components as well as training of key technical personnel, and projects are often structured as public-private-academic institution joint ventures. More information on NYSTAR programs can be found in Appendix A.

The industrial cluster organizations are shown as a distinct box, with a direct arrow to show funds flow in the schematic (figure 3), but in reality, the connection between ESD funding and industrial clusters is somewhat more amorphous than it is depicted here. The formalization of industrial cluster organizations in localities is a relatively new phenomenon in the US, born of an increasing awareness of the value of regional collaboration in a globalized economy. State- or national-level industry and professional associations more frequently represent the interests of cluster industries. Some of these associations are charged predominantly with lobbying responsibilities, others with the setting of standards and reviewing of new research. The funding that is extended to the members of a given industrial cluster by ESD may flow through firm-specific funding programs, but be obtained with the help and guidance of an industry association. Industry associations and regional industrial cluster organizations or consortia may also join together to obtain funding for training programs that are mutually beneficial to all members, but would lack the scale necessary to be successful if undertaken on a firm level. Direct ESD funding is available for such programs.

Significant funding is distributed to individual firms by ESD at both the state and regional levels for workforce development activities. In Rochester, an effort at maximizing collaboration and effective use of resources has been initiated by the Finger Lakes office of ESD and the Greater Rochester Chamber of Commerce. Called RochesterTraining.com, the program allows any Chamber member business to access a wide range of learning activities suitable for training incumbent workers. The program is designed to promote businesses offering “extra space” in their in-house training programs to the employees of other firms, as well as offering a platform for for-profit training providers to reach potential clients. However, a look at their course offerings and training providers (see Appendix E.) suggests that the sharing of in-house training programs has not yet become a substantial part of the offerings. The following table (table 1) sums up the programs of RochesterTraining.com, as presented in their on-line catalog, available at <http://www.nychamber.com/training/index.shtml>. These offerings have a workshop format and are appropriate for use with incumbent workers or with new hires. They do not have a prominent technical focus, although the connection to for-credit coursework at Rochester Institute of Technology (RIT) suggests that a technical component could be developed. There is also an expressed willingness to develop new training on a contract basis in collaboration with Chamber member businesses.

Table 1.

<b>RochesterTraining.com</b>		
<b>Program of Greater Rochester Metro Chamber of Commerce</b>		
<b>Subject Area</b>	<b>Workshops</b>	<b>Training Providers</b>
<b>Better Business Practices</b>	11 workshop topics	2logical
<b>Communications</b>	8 workshop topics	Applied Neurodynamics
<b>Computer/Internet</b>	30 workshop topics	Career Vision Associates
<b>Conflict Resolution</b>	1 workshop topics	Carosa, Stanton and DePaolo
<b>Credit Courses through RIT</b>	4 workshop topics	Delta Stratagem
<b>Human Resources</b>	13 workshop topics	Eagle International Institute
<b>Languages</b>	7 workshop topics	Element K Learning Center
<b>Leadership</b>	15 workshop topics	Federal Contract Consultants
<b>Manufacturing Technology</b>	16 workshop topics	The Leadership Factor
<b>Professional Development</b>	18 workshop topics	Mediation Center of Rochester
<b>Quality</b>	6 workshop topics	Michael A. Knaus and Associates
<b>Sales</b>	5 workshop topics	Nazareth College
		New Horizons Computer Learning Center
		Otto Associates
		Pegasus Technical Training
		Priority Management
		Reach and Achieve Associates
		Rewarding Solutions
		RGI International
		Rochester Institute of Technology
		UNISYS Corporation
		Wegman's
		WorkSmart Learning Systems Inc.

For additional information see Appendix E.

Source: <http://www.rnychamber.com/training/directory.htm>

The educational sector also has a number of programs funded at the state and federal (as well as institutional) levels to foster education and research efforts. Through various forms of partnerships with industry, these programs offer training components of great benefit to local industrial clusters associated with the area of metropolitan specialization. The academic programs offer highest-quality training for technical specialties associated with the Rochester area. Through a number of cooperative education, distance learning, and part-time learning options, the programs at Rochester Institute of Technology (RIT) and University of Rochester (U of R) enhance the availability of these opportunities to incumbent workers as well as those matriculated in a baccalaureate or graduate-level degree program, or pursuing postdoctoral studies. The descriptions of the various degrees offered at RIT and U of R, as well as descriptions of the campus-related Research Centers, laboratories and business outreach centers, is contained in Appendix B. The programs of two-year colleges and the Rochester Educational Opportunity Center, operated by SUNY Brockport, are considered separately, in a section to follow, as their workforce development funding is not accessed directly through ESD or through NYSTAR.

The following tables (table 2., 3., 4., and 5.) synopsise the programs available through RIT and U of R. Additionally, both universities are participants in the ESD-

funded Rochester-area CAT (Center for Advanced Technology). The Center for Electronic Image Systems, and the Microelectronics Design Center, which is an arm of CEIS, also include several other research universities from around the state. More detail about these programs is available in Appendix A. Further detail about RIT and U of R programs is contained in Appendix B.

**Table 2.**

<b>Rochester Institute of Technology (RIT) Academic Programs</b>	
<b>Digital Imaging and Publishing Technology</b>	Diploma A.O.S. Associate in Occupational Studies A.A.S. Associate in Applied Sciences
<b>Imaging and Photographic Technology</b>	B.S. in Imaging & Photographic Technology
<b>Imaging Science</b>	B.S. in Imaging Science M.S. in Imaging Science M.S. in Color Science Ph.D. in Imaging Science (Short Courses and distance learning courses are available.)
<b>Imaging Systems Management</b>	B.S. in Imaging Systems Management
<b>Printing and Applied Computer Science</b>	B.S. in Printing and Applied Computer Science
<b>Printing Technology</b>	M.S. in Printing Technology
<b>Product Development</b>	M.S. in Product Development
For additional information see Appendix A.	

Source: <http://www.rit.edu/>

As mentioned above in connection with the RochesterTraining.com, RIT has a highly-developed distance learning component that allows individuals, firms, and other training programs to utilize components of its offerings off-campus. Additionally, matriculated studies can also be completed on-line, with 8 graduate degrees, 3 graduate certificates, 5 undergraduate degrees and 15 undergraduate certificates available, according to its web site, <http://www.distancelearning.rit.edu>. RIT's strength in this area is a real opportunity for local, as well as more distant, employers.

Rochester Institute of Technology (RIT) is the third largest distance learning degree and program provider in the U.S. With over 6,300 enrollments and 20 years of experience, RIT offers students the benefits of anytime/anywhere education. With online student services such as advising, course materials, and library access available, RIT's format is designed to enable adults with professional and personal obligations to complete a full graduate or undergraduate degree without coming to campus. RIT online learning degrees offer the same high quality as on campus. <http://www.distancelearning.rit.edu>

This program, along with cooperative education programs that allow students to be engaged in local employment in their field of study while completing their degrees, are listed on the following table (table 3.) as business outreach programs. While they primarily benefit the individual who is enrolled, it can be persuasively argued that the presence of such students in the workplace on a daily basis facilitates the informal



transfer of technical knowledge to others in the environment, causing a more general indirect training effect.

Table 3.

<b>Rochester Institute of Technology (RIT) Research Centers, Laboratories, And Business Outreach Centers</b>	
<b>Center for Integrated Manufacturing Studies</b> Center for Excellence in Lean Manufacturing Corporate Education and Training Manufacturing Technologies National Center for Remanufacturing and Resource Recovery Printing Applications Laboratory	<a href="http://www.cims.rit.edu/">http://www.cims.rit.edu/</a>
<b>Center for Multidisciplinary Studies (CMS)</b>	<a href="http://www.rit.edu/~801www">http://www.rit.edu/~801www</a>
<b>Chester F. Carlson Center for Imaging Science (CIS)</b>	<a href="http://www.cis.rit.edu">http://www.cis.rit.edu</a>
<b>Digital Imaging and Remote Sensing (DIRS) Laboratory</b>	<a href="http://www.cis.rit.edu/research">http://www.cis.rit.edu/research</a>
<b>Digital Imaging Restoration Laboratory</b>	<a href="http://www.cis.rit.edu/research">http://www.cis.rit.edu/research</a>
<b>Laboratory for Advanced Spectral Sensing (LASS)</b>	<a href="http://www.cis.rit.edu/research">http://www.cis.rit.edu/research</a>
<b>Microdensitometry Laboratory</b>	<a href="http://www.cis.rit.edu/research/md.shtml">http://www.cis.rit.edu/research/md.shtml</a>
<b>Munsell Color Science Laboratory (MCSL)</b>	<a href="http://www.cis.rit.edu/mcsl">http://www.cis.rit.edu/mcsl</a>
<b>The John D. Hromi Center for Quality &amp; Applied Statistics (CQAS)</b>	<a href="http://www.rit.edu/eng/cqas">http://www.rit.edu/eng/cqas</a>
<b>Image Permanence Institute (IPI)</b>	<a href="http://www.rit.edu/ipi">http://www.rit.edu/ipi</a>
<b>IT Lab</b>	<a href="http://www.it.rit.edu">http://www.it.rit.edu</a>
<b>NTID High Technology Center for Electronic Publishing and Imaging</b>	<a href="http://htc.rit.edu">http://htc.rit.edu</a>
<b>Office of Cooperative Education and Career Services</b>	<a href="http://www.rit.edu/co-op/careers">http://www.rit.edu/co-op/careers</a>
<b>Office of Part-time Enrollment Services</b>	<a href="http://www.rit.edu/parttime">http://www.rit.edu/parttime</a>
<b>Online Learning</b>	<a href="http://www.distancelearning.rit.edu">http://www.distancelearning.rit.edu</a>
<b>Technology Management Center</b>	<a href="http://www.rit.edu/~930www/Proj/NewsEvents/2001/Oct02/coblink.html">http://www.rit.edu/~930www/Proj/NewsEvents/2001/Oct02/coblink.html</a>
<b>RIT Research Corporation</b>	<a href="http://www.ritrc.edu">http://www.ritrc.edu</a>
For additional information see Appendix B.	

The technical programs of interest to the Photonics, Optics and Imaging sector at the University of Rochester are more narrowly focused in the Institute of Optics (see table 4.). This program, however, has strong links to other U of R academic programs, most notably the Simon Graduate School of Business Administration, and such scientific programs as Astronomy and Medicine. A flexible summer school program is offered which is appropriate to the advanced training of incumbent workers from local firms.

Table 4.

<b>University of Rochester (U. of R.) Academic Programs Institute of Optics</b>	
Summer School	<a href="http://www.optics.rochester.edu:8080/">http://www.optics.rochester.edu:8080/</a>
B.S. Degree in Optics	<a href="http://www.optics.rochester.edu:8080/">http://www.optics.rochester.edu:8080/</a>
M.S. Degree in Optics	<a href="http://www.optics.rochester.edu:8080/">http://www.optics.rochester.edu:8080/</a>
Ph.D. Degree in Optics	<a href="http://www.optics.rochester.edu:8080/">http://www.optics.rochester.edu:8080/</a>
For additional information see Appendix B.	



Table 5., below lists the laboratories and research facilities at U of R. While the number of joint public-private research institutions housed at U of R is not as extensive as the number at RIT, the capacity to provide advanced-level specialized training for the sector is also important. Program depth, as well as a large number of available programs, is important in training a world-class workforce in the sector. The text box below highlights the broad range of manufacturing industries benefit from proximity to the Center for Optics Manufacturing.

**Table 5.**

<b>University of Rochester (U. of R.) Research Centers, Labs and Business Outreach Centers</b>	
Laboratory for Laser Energetics	<a href="http://www.lle.rochester.edu/">www.lle.rochester.edu/</a>
Center for Optics Manufacturing	<a href="http://www.opticam.rochester.edu/content/contents.htm">http://www.opticam.rochester.edu/content/contents.htm</a>
Center for Photoinduced Charge Transfer	<a href="http://www.chem.rochester.edu/~stc/home.html">http://www.chem.rochester.edu/~stc/home.html</a>
For additional information see Appendix B.	

### **The Center for Optics Manufacturing, University of Rochester**

The Center is operating at the edge of technology, creating real-world technology solutions capable of efficiently producing products that incorporate optical, electrical and mechanical elements. The Center's pioneering solutions will provide advanced system design tools, deterministic processes, and rapid response manufacturing capability that are the springboard for a world-class competitive U.S. optomechanics industry.

#### **Business**

Copiers and Fax Machines  
Laser Printers  
Optical Scanners  
Videoconferencing  
Optical Data Storage

#### **Medical**

Non-invasive Blood Monitoring  
Intracellular Chemical Imaging  
Laser Scanning Microscopy  
Laser Surgery  
Endoscopes

#### **Consumer Products**

Digital Imaging Systems  
Virtual Reality Simulators  
CCD and Camera Lenses  
High Definition TV  
Audio and Photo CD

#### **Military**

Missile Seekers  
Reconnaissance  
Laser Target Designators  
Thermal Weapon Sights  
Precision Guided Munitions

#### **Industrial Production**

Optical Measurement Systems  
Robotic Vision Systems  
Laser Welding  
Video Inspection Systems  
Nanoprecision Grinding

#### **Optoelectronics**

Optical Telecommunications  
X-ray and Laser Lithography  
Integrated Optics  
Laser Diode Optics  
Optical Sensors

Source: <http://www.opticam.rochester.edu/content/contents.htm>

In addition to institutions of higher education and business/academic partnership programs, some specialized professional and industry associations include both academic and industry researchers. The following table (table 5.) shows local resources in these categories.

**Table 5.**

<b>Professional Organizations with Significant Rochester Membership</b>		
Institute of Industrial Engineers Chapter 44	Professional Development Activities	<a href="http://www.iiech44.org/prodevelop/index.html">http://www.iiech44.org/prodevelop/index.html</a>
Rochester Engineering Society	E <sup>3</sup> -Fair, RES Scholarship, Affiliate Activities	<a href="http://www.frontiernet/~res.net/">http://www.frontiernet/~res.net/</a>
The American Precision Optics Manufacturers Association	Research, Professional Development Activities	<a href="http://www.opticsexcellence.org">http://www.opticsexcellence.org</a> <a href="http://www.apomanet.org/members.htm">http://www.apomanet.org/members.htm</a>
Photonics Industry Association of New York	Research, Forums, Setting Standards, Identify Industry Workforce Training and Education Needs	<a href="http://www.pianyny.org/">http://www.pianyny.org/</a>
The International Society for Optical Engineering	Courses, Workshops, Distance Learning	<a href="http://www.spie.org/">http://www.spie.org/</a>
Optical Society of America	Research, Journals, Books, Scientific Meetings	<a href="http://www.osa.org/aboutosa/">http://www.osa.org/aboutosa/</a>
Laser and Electro-Optics Society (of the IEEE)	Research, Journals, Conferences, Scientific Meetings, Local Chapter and Student Activities	<a href="http://www.i-leos.org/info/mission.html">http://www.i-leos.org/info/mission.html</a>
For additional information see Appendix D.		

The American Precision Optics Manufacturers Association is dedicated to promoting and advancing science, technology and business opportunities for the precision optics industrial base.

**APOMA objectives**

- Provide a forum for peers and associates to discuss opportunities and concerns in the optics industry.
- Initiate actions that stimulate advances in science, technology and business opportunities for the optical community.
- Serve as a unified, coherent voice in promoting expansion and growth of the optics manufacturing base.

Source: <http://www.opticsexcellence.org>

The adjacent text box is a statement of the mission and objectives of a specific one of these professional organizations. There is a complete list of the Rochester-area corporate members of APOMA included in Appendix D. APOMA is involved in the Center for Optics Manufacturing, as well.

There is a significant effort to enhance the local technical workforce via the recruitment of local college students to consider making their careers in the Rochester area. The IMC (formerly Industrial Management Council) and the Greater Rochester

Metro Chamber of Commerce are partners in GRrecruits, an effort to encourage local college students to seek employment in the area. A recent event, held at the Memorial Art Gallery, was a “Community Mixer” called “Showcase Rochester.” This event was promoted with the slogan “We want your future to be here!!” ([www.theimc.com](http://www.theimc.com) or [www.rnychamber.com](http://www.rnychamber.com)) A search of Empire State Development’s web site using the terms “workforce development” results in description of a similar statewide program, advertised in this way at <http://www.empire.state.ny.us/hightechskifree.htm>: “High-tech Job Fair Sponsored by Empire State Development and NYS Department of Labor—Find a High-tech Job and Ski or Snowboard FREE!!!” It may enhance the workforce to entice graduating students to seek employment in the state or the Rochester area, but these activities can more properly be thought of as recruitment aids, rather than skills development resources.

The IMC does offer a group of seminars and workshops that fall under the rubric of training resources, although these, similar to the RochesterTraining.com offerings, are not primarily geared toward technical skills development, outside of computer applications training. These are shown in table 6. below.

**Table 6.**

<b>IMC Working Solutions Training and Development Center</b>	
<b>Coaching</b>	1 workshop topic
<b>Communication</b>	11 workshop topics
<b>Customer Service</b>	1 workshop topic
<b>HSE Services</b>	1 workshop topic
<b>Human Resources</b>	8 workshop topics
<b>Interviewing</b>	1 workshop topic
<b>Leadership</b>	5 workshop topics
<b>Manufacturing Excellence</b>	2 workshop topics
<b>Performance</b>	5 workshop topics
<b>Project Management</b>	2 workshop topics
<b>Sales</b>	3 workshop topics
<b>Stress Management</b>	1 workshop topic
<b>Supervision</b>	2 workshop topics
<b>Teams</b>	1 workshop topic
<b>Time Management</b>	1 workshop topic
For additional information see Appendix F.	

Source: [www.theimc.com](http://www.theimc.com)

Other for-profit and non-profit organizations, as well as the IMC and the Greater Rochester Chamber of Commerce, offer contract services in various aspects of workforce development. One such non-profit entity is Career Development services, which offers both on-site and on-line options. Their web site at <http://www.careerdev.org/> describes their work as follows:

Since 1975, Career Development Services has partnered with individuals and organizations to help them grow, change and succeed. Services include assessments, counseling and coaching for individuals; transition services to meet outplacement needs of both individuals and organizations; and a wide range of corporate consulting services to solve retention problems and address other human capital management issues.

In addition to the on-site services that Career Development Center offers through its offices in Rochester and Corning, NY, the organization also provides a web-based contractual career services component called @tlas. It is in the section that describes the @tlas offerings that Career Development Services describes the breadth of their customer base:

Career Development Services, based in Rochester, NY, is a not-for-profit, educational organization that improves the quality of work life by providing comprehensive career planning services to individuals and corporations. We serve more than 10,000 individuals a year and our major employer clients have included Corning Incorporated, Eastman Kodak Company, United Technologies/Carrier, Mobil Oil, ARCO Chemical, Bausch and Lomb, Dow Corning, Union Pacific Resources, and Xerox Corporation. (<http://atlas.careerdev.org/atlas/contact/index.html>)

The local 2-year colleges, as well as the Rochester Educational Opportunity Center, are included in the group of organizations that may provide services on a contractual basis to employers that have obtained funding through programs in the economic development funding stream. The schematic shown in figure 4. below shows these in the vicinity of the funding stream, but without direct funding arrows.

Figure 4.

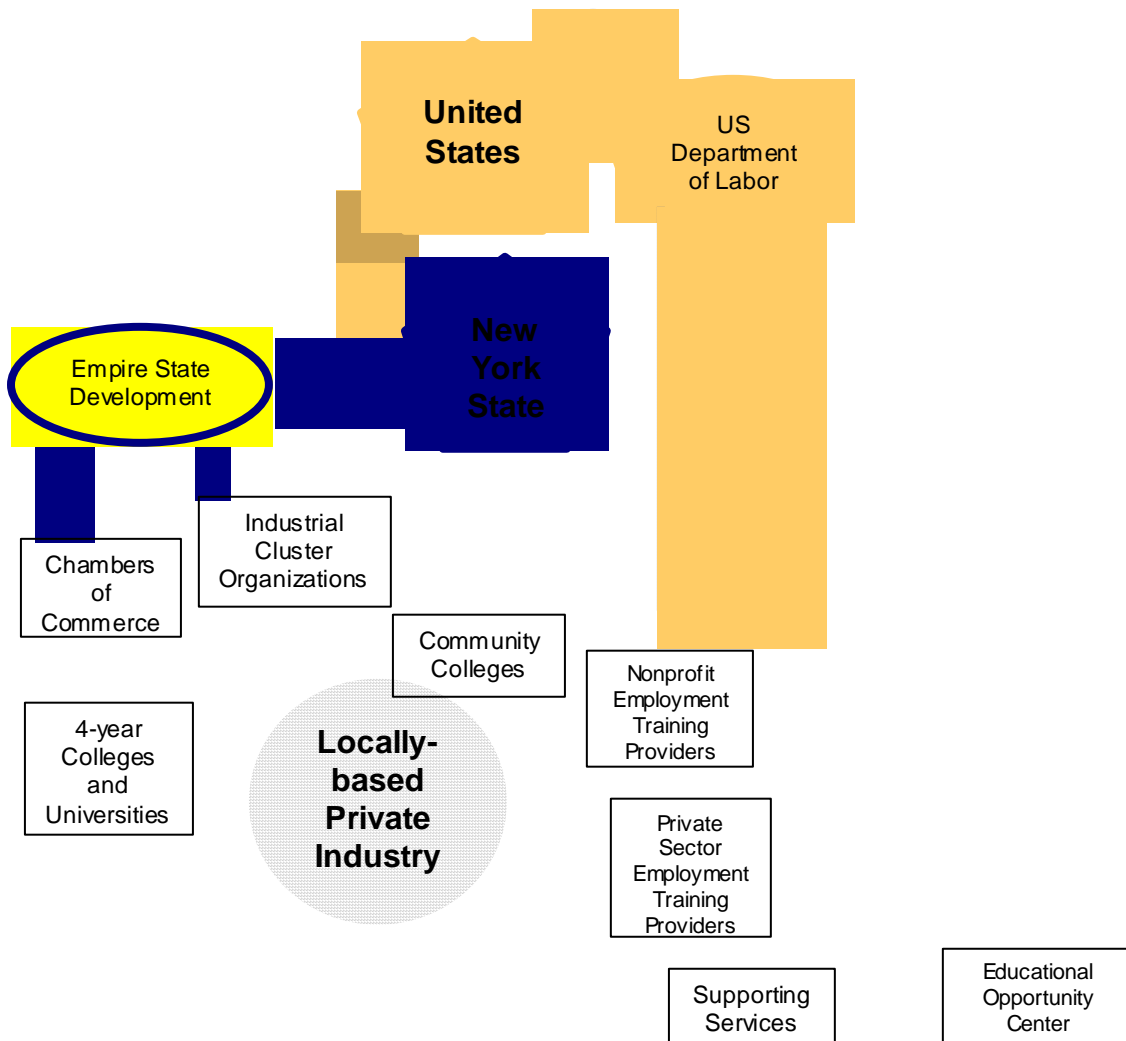


Figure 4. includes a box labeled “supporting services.” While these kinds of services, including such things as child care, transportation and meals, may not be included in every contractual training program, employers are increasingly seeing them as necessary incentives to employee participation, particularly when employees are attending training events on unpaid time.

The following table shows the opportunities available through academic programs in the technical areas appropriate to the Photonics, Optics and Imaging sector at Monroe Community College (MCC). MCC is the only local resource that was found that offers credit-bearing optics technology courses that lead to an associate degree. Certificate programs are also available.

Table 7.

<b>Monroe Community College Academic Programs</b>	
<b>Optical Systems Technology</b>	Certificate Program
<b>Optical Systems Technology</b>	A.A.S. Degree
<b>Manufacturing Technology—Robotics/Automation</b>	A.A.S. Degree
<b>Industrial Instrumentation Technology</b>	A.A.S. Degree
<b>Engineering Science</b>	A.S. Degree
<b>Industrial Instrumentation Technology</b>	Certificate Program
<b>Electro-Optics Technology</b>	A.A.S. Degree
For additional information see Appendix C.	

Source: <http://www.monroecc.edu/>

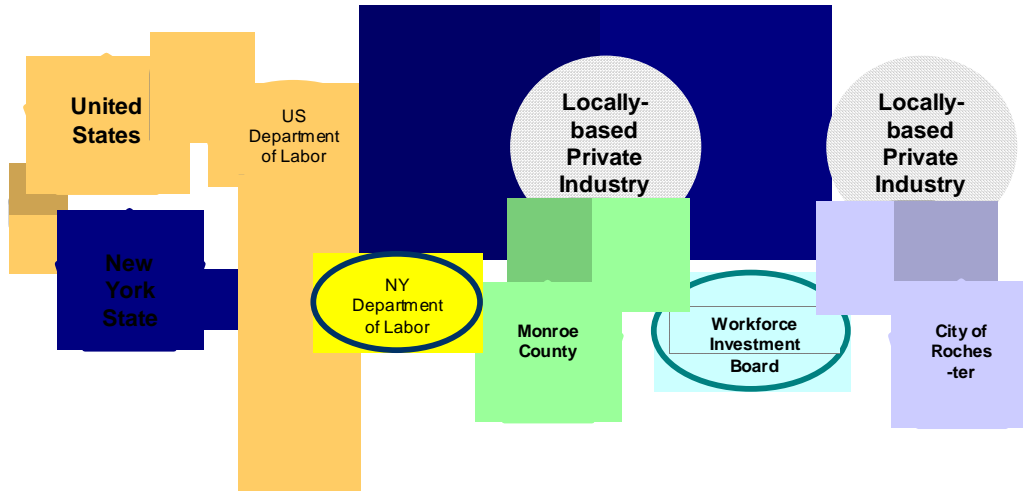
MCC offers extensive contract training options, with and without credit, to employers, and expresses the willingness to devise entire degree programs to meet industry requirements, on a contractual basis. MCC also offers a very impressive catalog of distance learning options, and, through the SUNY Learning Network, provides a link to distance learning courses offered by other community colleges and SUNY four-year colleges around the state. (<http://www.monroecc.edu>) For more details, see Appendix C.

After cataloguing the resources that can be brought to bear on the development of the local workforce to meet the training needs of the Photonics, Optics and Imaging sector that are at least in part funded through the economic development funding stream, it is now time that we turned to the Workforce Investment Act funding stream itself. This branch of workforce development funding in New York State also has some programs through which the state agency, the Department of Labor, makes funds directly available to localities, using competitive grant programs and other demonstrations and earmarked projects. However, in the interest of simplifying the fragmentation that was so universally criticized under the JTPA funding regimen, a concerted effort has been made to centralize local workforce training funding under the authority of the local Workforce Investment Boards (WIBs), and to provide for employer leadership in these endeavors by requiring employers to make up the majority of those appointed to the WIB.

In the Rochester area, the WIB has combined the efforts of the County of Monroe, the City of Rochester, the Greater Rochester Chamber of Commerce, and the IMC. The level of resource contribution from each is unclear—certainly the WIA funds at this time

appear to make up the largest section of the funding that is available through the WIB. There are other private sector actors taking an active role in the work of the WIB, so the IMC and the Chamber of Commerce are depicted as simply “Locally-based Private Industry” in the schematic, Figure 5. below.

Figure 5.



The WIA provides a structure in which the local area develops a “one-stop” approach to the delivery of employment and training services. Firms are the primary “customers” in the economic development funding stream, workers are the primary “customers” in the stream that flows through the Department of Labor. The structure of the one-stop approach is that information and resources are centralized to facilitate jobseeker access to all locally-available resources from one location, and to make it easier for employers to make job openings known to all prospective employees in the area. The Workforce Investment Board, with its majority of private sector members, is entrusted with the leadership in the formation of an entity that can fund and administer the physical one-stop program. There is some funding for the provision of services beyond the basic, core services that are to be universally available to all workers, but most of the funding for “intensive services” is to be used in aiding individual jobseekers to devise an employment plan. Given the “work first” and to provide for “Individual Development Accounts” that are to be used in the

The reality is that WIA accounts for only a very small share of the funds potentially available for workforce development, yet state and local WIBs are expected to provide the leadership for and direction to this larger workforce system over which they have little or no authority... The WIA is expected to wag the much larger workforce development dog. Such expectations are unrealistic to say the least.

[O'Shea, 2001 #60]

Figure 6.

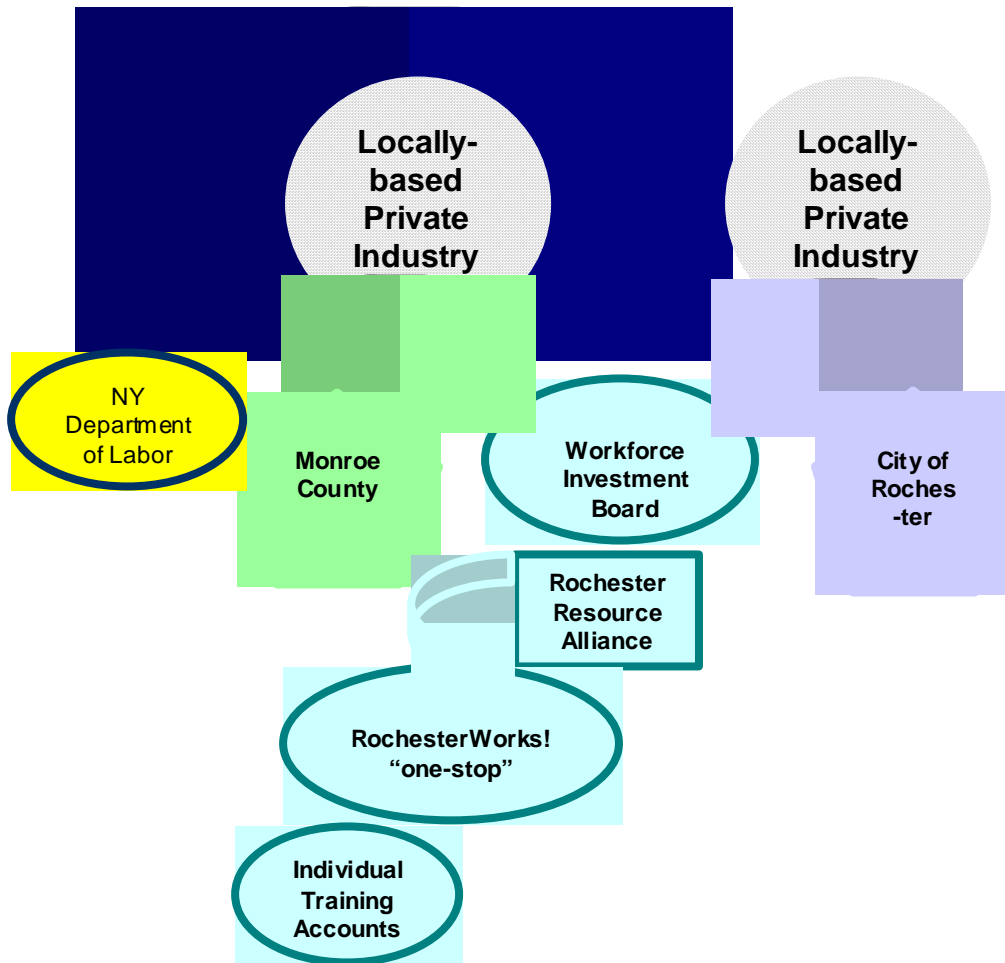
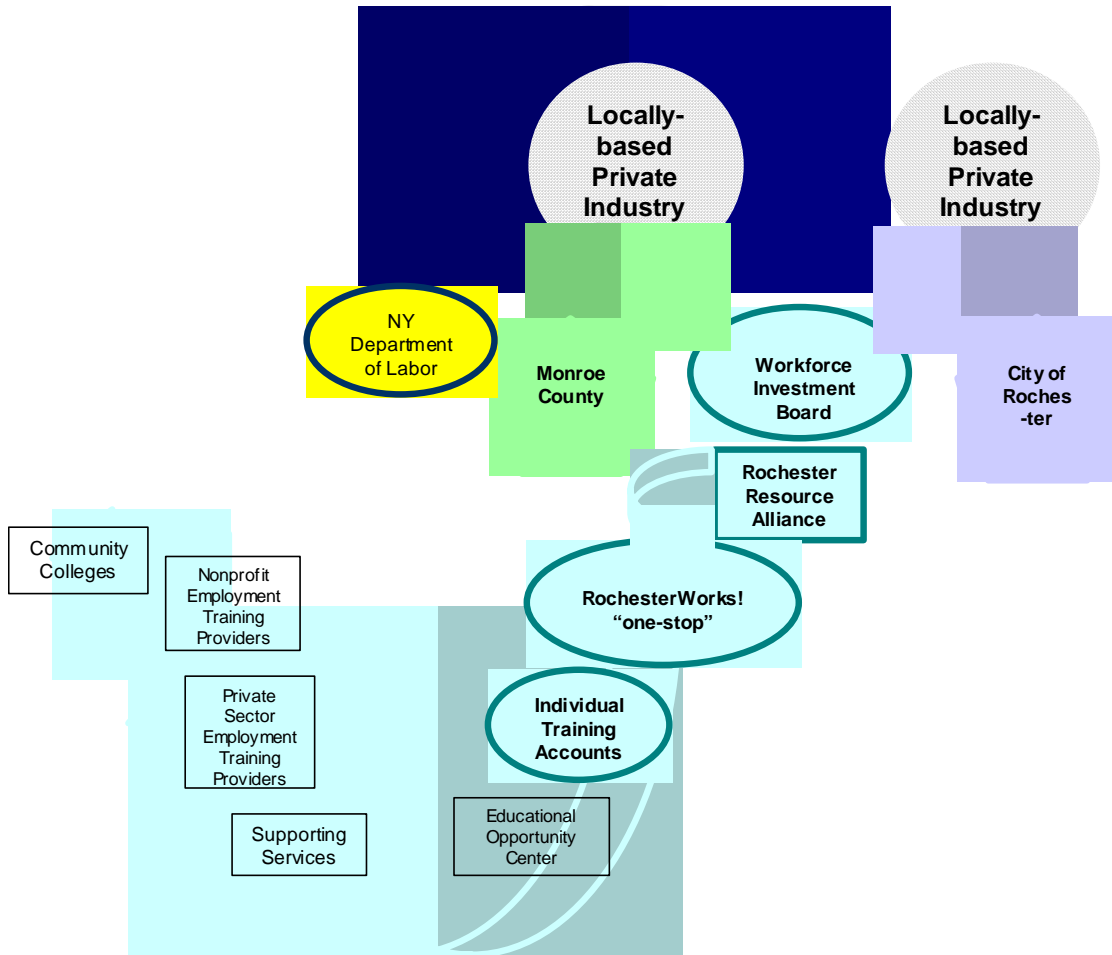




Figure 7.



<b>Rochester Resource Alliance Classroom Training Providers Possibly Relevant to Sector—Nonprofit and Public Sector</b>			
<b>ABVI-Goodwill</b>	422 Clinton Avenue, Rochester 14620	232-1085 x. 362	Introduction to Computers in the Workplace
<b>Genesee Valley BOCES</b>	27 Lackawanna Avenue, Mt. Morris 14510 8250 State Street Road, Batavia 14020	658-7820  344-7720	Electronics Technology
<b>Monroe #1 BOCES</b>	41 O'Connor Road, Fairport 14450	383-2256	Electronics Technology
<b>Monroe #2 – Orleans BOCES</b> Center For Workforce Development	3589 Big Ridge Road, Spencerport 14559	352-2494 or 2761	Manufacturing Tech. (Machining, Welding) Computer Applications for Professionals Network Technician
<b>Rochester City School District</b> Westside Adult Learning Center	420 Chili Avenue, Rochester 14611	235-3990	A+ Computer Training
<b>*Rochester Educational Opportunity Center</b>	305 Andrews Street, Rochester 14604	232-2730	Introduction to Computers
<b>Rochester Rehabilitation Center (IT2)</b>	114 South Union Street, Rochester 14620	232-4600	Applications Development and Programming Client Support Administrator Information Coordinator
<b>Syracuse University Center for Business Information Technologies (CBIT)</b>	700 University Avenue, Room 203, Syracuse 13244	(315) 443- 3140	Business Application Developer Enterprise Resource Planning CISCO Certified Network Associate (CCNA) Internet Application Developer

<b>Rochester Resource Alliance Classroom Training Providers Possibly Relevant to Sector—Private Sector</b>			
<b>Academy for Career Development, Inc</b>	1349 South Avenue, Rochester 14620	244-1430	Client Support Technician Program Office Information Coordinator Program
<b>Accent Training</b>	Gateway Plaza, 2352 Lyell Avenue, Rochester 14606	247-6310	Microsoft Office Comprehensive
<b>Bryant &amp; Stratton</b>	1225 Jefferson, Rochester 14623 or 150 Bellwood Drive, Rochester 14606	272-7200	Certificate Programs: Computer Applications Diploma Programs: Business Assistant, Information Technology Assistant Degree Programs: Accounting, Electronic Technology, Information Technology
<b>CompUSA Inc.</b>	400 Jefferson Road, Rochester 14623	424-7610	PC Troubleshooting – A+
<b>Computer Confidence, Inc</b>	39 Saginaw Drive, Henrietta 14623	292-9900	A+ Certification Office Information Coordinator A+ and Network + Cert PLUS Office Tri-Tec Office Coordinator MOUS Certificate Web Development and Design Network+ Certification Certified Internet CompTIA iNet+
<b>Element K Learning Center</b> (formerly Ziff-Davis)	500 Canal View Boulevard, Rochester 14623	240-7725	A+ and Network + Certification Pathway Web Design/Development MOUS Certification (MS Office User Specialist) Web Design Track Pathway Systems Administration
<b>ExecuTrain of Upstate New York</b>	260 West Ridge Road, Rochester 14626	720-1130	Certified Internet Webmaster – Foundations
<b>IKON Office Solutions</b>	1200C Scottsville Road, Rochester 14624	235-1190	A+ Certification MS Certified Engineer Windows 2000 Certified Novell Engineer MS Certified Professional NT 4 Certified Novell Administrator MS Certified Systems Engineer MS Certified Professional-Core MS Certified Professional + Internet MS Certified Professional for Visual Basic MCP for Windows 2000 MS Certified Professional for Visual Basic Extended TECH2000 Windows 2000 Baseline MS Certified Solution Developer TECH 2000 Windows 2000 MCSE Cisco Network courses





Figure 9.

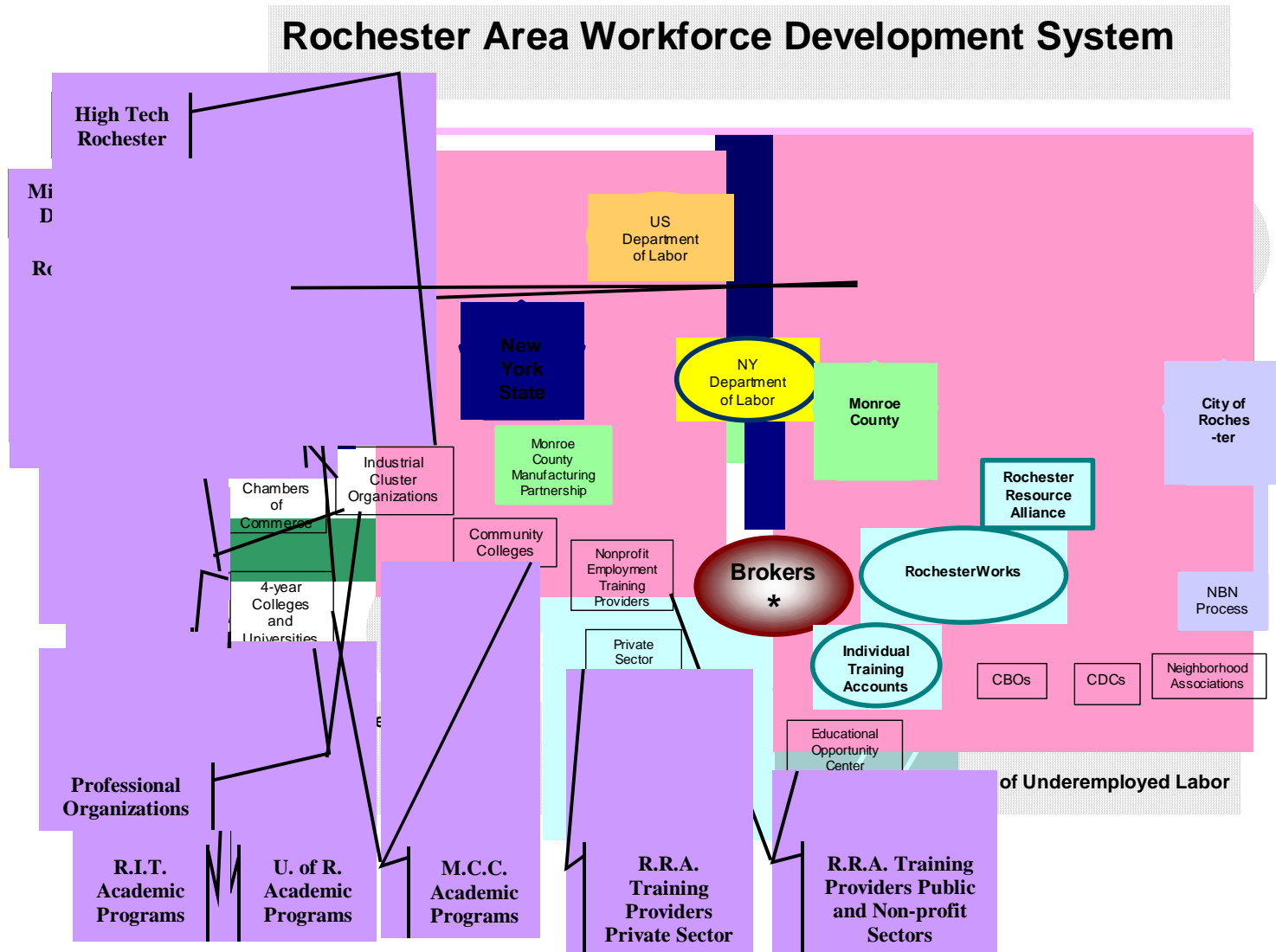


Figure 10.

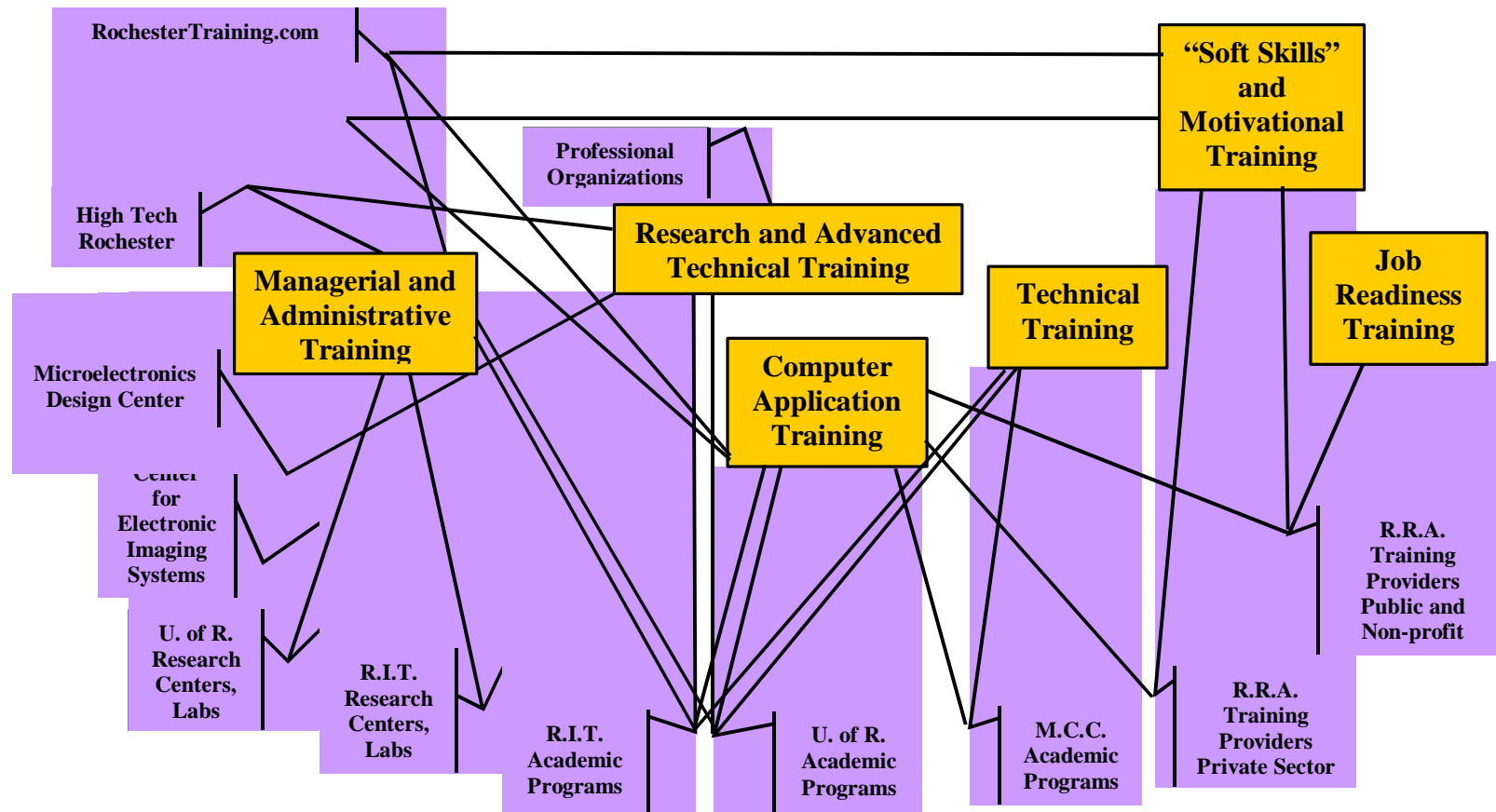
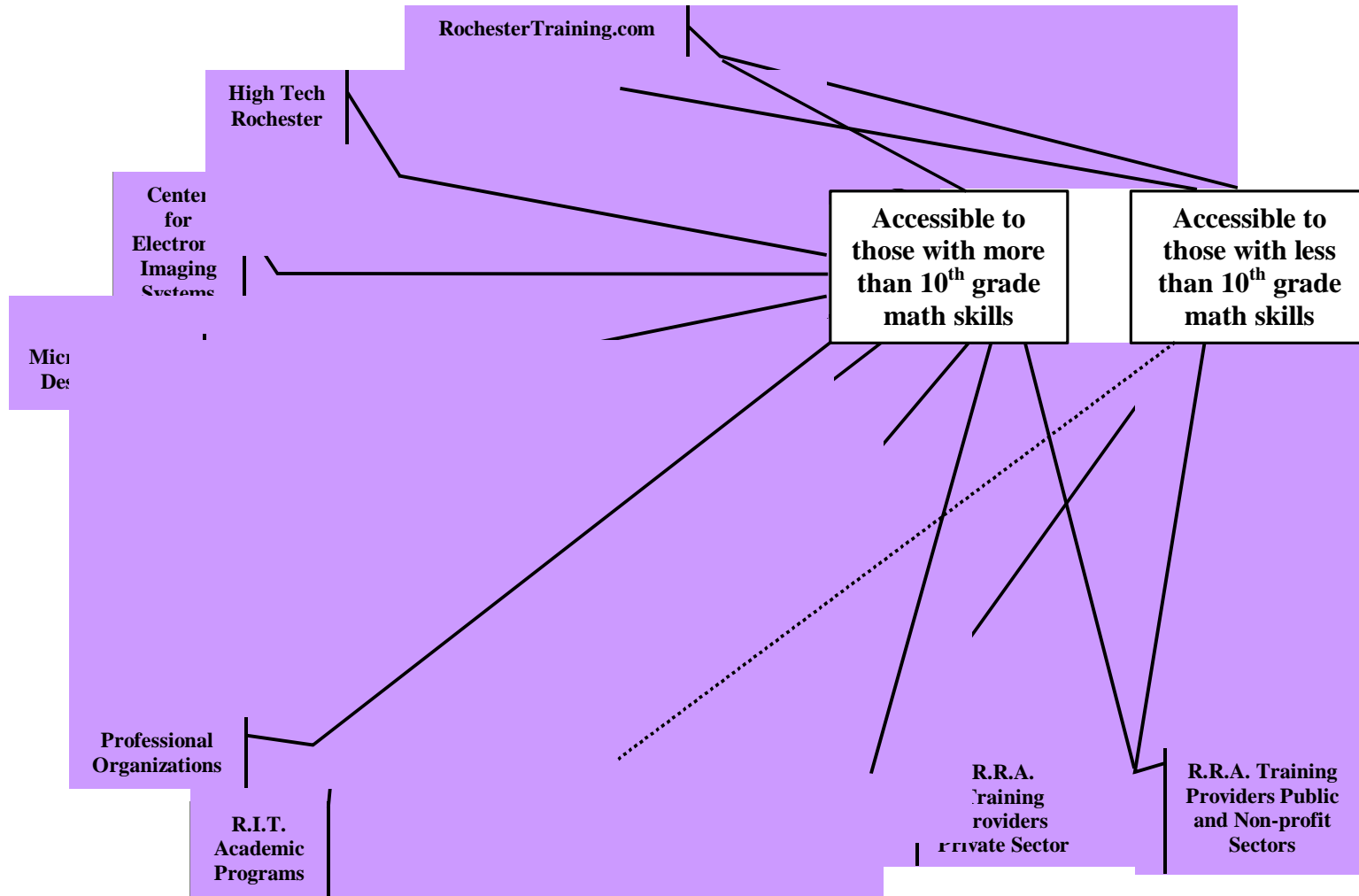




Figure 11.





## **APPENDIX A.**

### **New York State Level Programs**

#### **Strategic Training Alliance Program (STRAP)**

A joint Empire State Development/Department of Labor funding program.

Information obtained from:

<http://www.empire.state.ny.us/press/07%2D20%2D01strap%20final.htm> --

STATE OF NEW YORK  
EXECUTIVE CHAMBER  
GEORGE E. PATAKI, GOVERNOR

FOR RELEASE:

IMMEDIATE, Monday

July 16, 2001

Press Office

518-474-8418

212-681-4640

<http://www.state.ny.us>

#### **GOVERNOR PATAKI ANNOUNCES \$5.4 MILLION IN WORKER TRAINING** 53 Businesses to Receive STRAP Funding to Upgrade Skills of Workers

Governor George E. Pataki today announced that nearly \$5.4 million in workforce training funds from the Strategic Training Alliance Program (STRAP) has been awarded to 53 businesses throughout New York State.

The funding - which will benefit more than 9,000 workers - will provide individual employers or business groups with the opportunity to upgrade the skills of their employees.

"We are committed to ensuring that New York-based companies have the most highly skilled and qualified workforce in the nation," said Governor Pataki. "This funding will support the types of innovative job training and educational programs we need to help New York-based firms compete and win in the challenging and rapidly changing global marketplace.

"Since 1995, we've helped create more than 820,000 private sector jobs all across New York State," the Governor said. "And by supporting smart and successful programs like STRAP, we will ensure that our economy can continue growing even stronger in the days to come."

The New York State Department of Labor and Empire State Development Corporation (ESD) jointly oversee the STRAP program, which is designed to help identify and address employer demands for skilled workers.

A total of \$34 million in STRAP funding will be appropriated for use over the next three years. The funding will be used to help businesses train new and incumbent employees in such fields as engineering, food processing, machine trades, tool & die making, forklift operating and technical support.

State Labor Commissioner Linda Angello said, "Skilled workers are at the heart of the Governor's redesigned workforce development system. This initiative helps businesses increase productivity by ensuring their employees have the skills and experience to work in high performance workplaces, thus making STRAP an effective economic development tool."

ESD Chairman Charles A. Gargano said, "Over the past six years, Governor Pataki has developed an economic development strategy focused on making New York a more competitive place to do business. The STRAP program achieves our goal by keeping New York businesses and workers on the cutting edge."

Those interested in applying for STRAP should contact the nearest Regional Administrator's Office of the New York State Department of Labor or the local Regional Office of Empire State Development to develop a proposal. Funding may be used for the cost of classroom training, curriculum development, and job retraining, including on-the-job training. Additional information is also available online at [labor.state.ny.us](http://labor.state.ny.us) or [www.empire.state.ny.us](http://www.empire.state.ny.us).

## **New York State Office of Science, Technology and Academic Research (NYSTAR) Programs**

Information obtained from:

<http://www.nystar.state.ny.us/research.htm>

### **Strategically Targeted Academic Research (STAR) Centers and Advanced Research Centers (ARCs)**

The Strategically Targeted Academic Research (STAR) Centers and the Advanced Research Centers (ARCs) play a critical role in the State's plan to expand high-tech research and economic development, attract world-class scientific researchers to New York, and create new technology-based jobs and businesses across the State.

Under the plan, STAR Centers will serve as world-class academic research facilities that offer a dynamic combination of state-of-the-art facilities, cutting-edge technology and the world's most sought after academic and scientific talent. The ARCs will serve as vital research centers that will conduct world-class research in a concentrated and specifically focused area.

By creating world-recognized academic research centers, New York has earned itself a place as a global leader in high technology research and development. These select research centers will provide the impetus for the next round of high-tech growth in the State.

### **Centers for Advanced Technology (CATs)**

The Centers for Advanced Technology (CAT) Program was created to capitalize on New York's outstanding university research resources, and use those resources to create jobs and opportunity. At each CAT, researchers at New York's leading research universities work side-by-side with their counterparts in large and small companies to develop new technologies.

This cooperative effort produces new products and processes, creates new businesses, and ultimately, leads to high-quality, high-value jobs for New Yorkers.

Since its establishment, the CAT Program has supported university-industry collaboration in research, education and technology transfer, with a strong focus on helping New York businesses gain a technological edge on their competition.

Overseen by NYSTAR, the CAT Program is fueling continued growth in some of the most promising technologies of tomorrow and in some of the most important sectors of the State's economy.

### **Regional Technology Development Centers (RTDCs)**

RTDCs, that are located across the New York State, provide direct assistance to New York companies in a variety of ways. Through three programs - the Technology Development Organization (TDO) Program, the Manufacturing Partnership (MEP) Program, and the Industrial Technology Extension Service (ITES) Program - the centers provide entrepreneurial and business assistance, financing and venture capital information, and federal research grant information and assistance to employers across our state.

The centers also play a key role in helping new and emerging businesses move a new technological breakthrough from the research lab to the marketplace and provide education and training, facilitate the transfer of new technology to market, assist companies, integrate new technologies into their business

processes, and provide business planning and quality control guidance. The centers' expertise helps New York's companies maintain their leadership roles in today's competitive business environments.

#### **Science and Technology Law Center Program**

Under NYSTAR's direction, the New York State Science and Technology Law Center will conduct legal research, and assist academic institutions, early stage and start-up technology companies, with reduced-cost legal consultation and services critical to research, product development and distribution, and business development. The objectives of creating the NYSTAR-designated Science and Technology Law Center are to increase awareness and understanding of legal issues among high technology entrepreneurs and technology companies; facilitate the business development process and commercialization of new technology developed in New York; conduct research on issues of emerging industry fields; encourage the research and technology transfer capabilities of Centers for Advanced Technology, technology development organizations, and their partners; encourage venture capital investment in university-based, high technology projects in New York State; educate entrepreneurs about legal issues, rights, and responsibilities; advise the agency on legal issues involving science and technology; promote economic development in New York State through university-based research and product commercialization in high technology industries; and establish New York as a center of excellence for high technology-related legal research and expertise.

#### **Rochester STAR Center**

Information obtained from:

<http://www.nystar.state.ny.us/stardetails.htm>

#### **The Information Technology Collaboratory at the Rochester Institute of Technology**

Backed by a \$14 million NYSTAR grant, the Information Technology (IT) Collaboratory at the Rochester Institute of Technology will create key technologies and capabilities to design and integrate next-generation information technology systems. The Center will focus on four key areas: Microsystems, photonics, high-bandwidth networks and remote systems.

The STAR Center's partners include Alfred University and SUNY Buffalo's Institute of Lasers and Photonics. Its research is strongly supported by Kodak, Corning, Xerox and Global Crossing, Inc.

The STAR Center will address much needed improvements in communications bandwidth and speed by designing, building, testing and commercializing microsystems and optical communications networks. It will also work toward applying microsystems and networks to IT systems known as integrated remote systems using imaging systems. The research includes projects such as DNA BioMEMS to identify DNA fragments, SWCN actuators, and thin film optical switches. The work that will be done at the Center will likely establish the Rochester region as a locus for research and technology development in this field.

Information obtained from:

<http://www.empire.state.ny.us/press/release2001.htm> --

STATE OF NEW YORK  
EXECUTIVE CHAMBER  
GEORGE E. PATAKI, GOVERNOR

Press Office  
518-474-8418  
<http://www.state.ny.us>

FOR RELEASE: IMMEDIATE:

Monday, January 22, 2001

Senator Schumer Contact:  
Phil Singer (202) 224-7433

GOVERNOR PATAKI, SENATOR SCHUMER ANNOUNCE MAJOR PRIVATE SECTOR  
INVESTMENT IN ROCHESTER

Corning, Kodak & Xerox Lead \$75 Million Effort for Rochester Center of Excellence

Governor George E. Pataki and Senator Charles E. Schumer today were joined by executives from Kodak, Corning and Xerox to begin a campaign to raise \$75 million in private sector investment for the Governor's plan for a Center of Excellence in Photonics and Optoelectronics in Rochester. The three companies pledged \$45 million for the Center and committed to helping raise the remainder in partnership with other private sector companies.

The Center will serve as a major component of Governor Pataki's new \$1 billion hi-tech/biotechnology initiative, which he announced in his recent State of the State address.

"The fact that this remarkable investment from leading technology companies has come forward so quickly demonstrates that our new Centers of Excellence initiative will produce tremendous benefits for the Rochester economy and the entire State," Governor Pataki said. "Clearly these world leaders in high-tech recognize our top-flight research institutions and business infrastructure will serve as the building blocks for the 21st century economy. I look forward to the unprecedented partnership this Center will forge between the State, industry leaders and our research institutions, as well as the support from Senator Schumer and our Congressional delegation."

Senator Schumer said, "Rochester is taking a huge step forward today towards becoming the unparalleled center for optics research in the world. About two years ago, Rochester got a scare from the Midwest when a lobbyist tried to create a national center of optics research in St. Louis. It took some doing but we quashed that proposal and started the effort to create such a 'Center of Excellence' right here in the optics capital of the world - Rochester. Thanks to the commitment of Kodak, Corning and Xerox, our outstanding universities and my partner in this endeavor, Governor Pataki, we are now on the road to ensuring Rochester's place as the pillar of the high-tech optics imaging industry."

In a joint statement, Kodak Chairman, President and CEO Daniel A. Carp, Corning Chairman and CEO Roger G. Ackerman and Xerox Chairman and CEO Paul Allaire said, "Upstate New York is a technology and manufacturing hub, rich with knowledge, experience and creative innovation in optics and optoelectronics. These technologies will produce the next generation of products coming from many of our New York State companies. Through close public and private sector collaboration and investment, New York will maintain a leadership position in these strategic technologies."

Empire State Development Chairman Charles A. Gargano said, "With the establishment of a Center of Excellence in Photonics and Optoelectronics at Rochester, New York has the opportunity to become a national leader in optoelectronics-related R&D and job growth the same way that Silicon Valley became a hub for the semiconductor industry. Thanks to the Governor's vision and foresight, this Center of Excellence will ensure that New York companies, such as Corning, Kodak and Xerox, continue to make the transition to the new technologies and products in the fields of optoelectronics and photonics, and continue to add jobs throughout our State."

The Center of Excellence at Rochester will be a partnership between the State, Kodak, Corning, Xerox, additional private sector companies, the University of Rochester, the Rochester Institute of Technology, the University at Albany, Rensselaer Polytechnic Institute, Alfred University and Cornell University. In addition to the \$45 million pledged today, Corning, Kodak and Xerox have committed to raising the remainder by partnering with other high-tech companies.

Governor Pataki, in his 2001-02 Executive Budget, proposed \$283 million over five years to provide State support and matching funds to critical private sector and federal investments in emerging high technology fields. The State funds are expected to leverage approximately three times their value in federal and private funds.

New York State is already a hub for the optoelectronics and imaging industry, employing more than 91,000 persons in these fields B about 13 percent of the national total.

The Governor's "Centers of Excellence" plan will provide a critical job-creating bridge between the New York State Office of Science, Technology and Academic Research's (NYSTAR) long-term research programs, such as the Strategically Targeted Academic Research (STAR) Centers, and the business community.

Russell W. Bessette, M.D., Executive Director of NYSTAR, said, "As a result of the Governor's efforts, there is a powerful new incentive for businesses to create new technologies. The research and development efforts being done by universities and businesses in New York will lead to new jobs. NYSTAR is a strong supporter of using industry/university partnerships as an economic engine to develop new products for the 21st century."

Efforts at the Rochester Center for Excellence in Photonics and Optoelectronics will focus on creating technology transfer and pilot fabrication facilities for high resolution imaging and ultra-fast communications devices that can be shared by Center partners to accelerate product development. Associated workforce development and training programs to provide the highly skilled personnel for these industries will also be supported by the Center.

Advances in these emerging fields are expected to lead to the development of revolutionary medical devices. Possibilities include development of a small, high-tech capsule a patient could ingest in order to provide physicians with pictures of damaged internal organs. Major advances are also anticipated in the development of new devices to monitor and improve the environment.

Today's announcement is a direct result of the Governor's call in the 2001 State of the State address to establish the Center of Excellence in Photonics and Optoelectronics at Rochester. This partnership will serve as a model for other State investments in emerging technology job development, including additional Centers of Excellence currently under development in Buffalo, Albany, Long Island and other areas of the State.

The partnership reflects the State's ongoing commitment to support activities identified by the business community, such as product development, workforce training and leading-edge research that will make New York the world's premier location for technology-related businesses.

Under the leadership of Corning, Kodak, Xerox and the State, the Center of Excellence in Rochester will collaborate with the Rochester Institute of Technology, the University of Rochester, the University at Albany, Rensselaer Polytechnic Institute, Alfred University and Cornell University to secure New York's leading position in photonics, optics and fiber optics. The use of light to transfer energy and information is making ever-faster and smaller devices possible, with wide applicability from medicine to telecommunications.

There are 15 CATs (Centers for Advanced Technology) in New York State.  
(<http://www.nystar.state.ny.us/cats.htm>) Rochester's CAT is described below.

Information obtained from:

<http://www.nystar.state.ny.us/rochester.htm>

### **CAT in Electronic Imaging Systems**

Jointly sponsored by the University of Rochester and the Rochester Institute of Technology, the Center's mission is to conduct basic research in the field of electronic imaging and to leverage these results for economic advantage to New York State and the nation. The long-term vision of the CEIS is to establish and maintain a leading national center for all phases of electronic imaging systems. This thereby contributes to the effort by the United States to retain its world leadership in imaging, document processing, and telecommunications.

The overall goals of CEIS include the development of new technology, technology transfer, and economic development. On-site interaction among faculty, students at all levels from undergraduate through post-doctoral, and industry participants is a key element in the Center's programs.

CEIS has also developed a dynamic outreach program that helps small, vital businesses be competitive on a national and global scale. The outreach program also includes an active lecture, seminar and workshop



Draft of training resources piece

12/18/01

Krys Cail

series that brings scientists and engineers from industry and academia together. Here they can share ideas, learn new technology and establish important long term relationships.

University of Rochester/Rochester Institute of Technology  
240 East River Road,  
COI Building,  
Rochester, NY 14623-1212  
Phone: 585-275-3999  
[www.ceis.rochester.edu](http://www.ceis.rochester.edu) [see information from this web site below]

There are 10 RTDCs (Regional Technology Development Centers) in New York State. (<http://www.nystar.state.ny.us/rtdcs.htm>) The Rochester area RTDC is described below. Information obtained from: <http://www.nystar.state.ny.us/htr.htm>

### **High Technology of Rochester (HTR)**

We are an independent, not-for-profit organization that serves technology-based businesses in the Greater Rochester area with training, consulting, and connections to key resources.

Our mission is to stimulate the growth of the Greater Rochester technology-based business sector and to improve the competitive position of small and medium manufacturing companies through product and process innovation.

High Technology of Rochester  
5 United Way, Rochester, NY 14604  
Phone: 716-327-7920  
[www.htr.org](http://www.htr.org) [see information from this web site below]

<http://www.ceis.rochester.edu/>

12/30/01

### **The Center for Electronic Imaging Systems**

CEIS is a New York State Office of Advanced Science, Technology and Academic Research (NYSTAR) Designated Center for Advanced Technology.

CEIS is devoted to enhancing the economic development of the greater Rochester region and New York State by developing and transferring electronic imaging technology into industry for commercialization, and by educating the next generation of leaders in the field of electronic imaging.

The Microelectronics Design Center (MDC), an arm of CEIS, is focused on improving the current condition in microelectronic circuit design research and enabling the development of new and improved integrated circuits.

### **CEIS Member Companies**

**Ameritherm**

We are the leading manufacturer of micro-processor based, solid state RF induction power supplies. Our company was established in 1986 and is privately held. We manufacture our products at our ISO 9001 quality system certified facility in Scottsville, New York, a suburb south of Rochester. Ameritherm products are sold worldwide through a network of Manufacturer's Representatives. From electrical engineering to master coppersmithing, our staff has the knowledge and experience to support your application - from initial contact through product delivery, and beyond. Every day, we help our customers reinvent the way they do business, with creative solutions to the most challenging heating problems.

**Apple Aid**

Apple Aid investigates advanced computer software technologies and develops them into profitable, popular, and useful commercial products for home and business. The company creates high quality software for computers running Mac OS, Windows 95, Windows 98, or Windows NT. Specializations are in the areas of graphics (their products have won several awards), image processing, artificial intelligence, computer vision, and robotics.

**Applied Image Group**

Since 1978, the APPLIED IMAGE Group has been a key industrial provider of photonic, imaging, & electro-optic components, and systems, to the optical, fiber optic, lighting, digital, medical, communication, scanning, automotive, imaging, and photonic markets.

**Bausch & Lomb**

The company is a leading maker of contact lenses and lens care solutions (including the ReNu and Boston brands). In addition to its eye care products, the company also makes ophthalmic surgical equipment and prescription and over-the-counter medications. The company has expanded these operations through acquisitions and increased R&D funding. To focus on and strengthen its core business, Bausch & Lomb has sold its sunglasses division (including the Ray-Ban brand), its Miracle Ear hearing aid business, and its Charles River Laboratories animal research business.

**Burleigh Instruments**

Founded in 1972, Burleigh Instruments, Inc. is a leading manufacturer of precision scientific instruments used in basic and applied research, engineering, and production test applications in a variety of fields. Its products include laser test and measurement instruments, nanopositioning systems and micromanipulators, and surface imaging and measurement instruments. The wide range of products is based on similar technologies such as precision mechanics, optical interferometry, and electro-active ceramic devices (based on a phenomenon known as piezoelectricity).

**CID TECH**

CIDTEC develops and manufactures application-specific solid state sensors and cameras using our proprietary Charge Injection Device pixel architecture. We implement the CID structure in CMOS or our proprietary PMOS process for our OEM partners in the medical, scientific, industrial, or radiation hardened fields. We also offer a full line of standard imagers and cameras to solve the tough imaging problems encountered in robotics, machine vision, X-ray imaging, space based laser tracking & stellar guidance systems, astronomy, military, and inspection in high radiation environments. CIDTEC brings you a 23 year history of product quality, responsive service, and sound technical knowledge.

**COMPSYS**

**Corning Incorporated**

Corning provides communications technology at light speed. Once known primarily for its kitchenware and lab products, the materials pioneer is the world's top maker of fiber-optic cable, which it invented more than 20 years ago. Corning's growing telecommunications unit (about 60% of sales) makes optical fiber and cable and photonic components. The company's Advanced Materials unit makes industrial and scientific products, including emission controls and semiconductor materials. Corning's Information Display segment makes glass products for televisions, VCRs, and flat-panel displays.

**Eastman Kodak Company**

Kodak is the world leader in imaging with headquarters in Rochester, New York and manufacturing operations in Canada, China, Mexico, Brazil, the United Kingdom, France, Germany, Australia and the U.S. Kodak's seven business groups serve customers in over 150 countries worldwide: Kodak researches and develops electronic imaging hardware and media and

new techniques for exploiting the versatile characteristics of silver halide based systems, as well as product that bridge both realms. When it comes to imaging science and technology, Eastman Kodak Company is constantly seeking and finding new ideas and better solutions. Our research and development efforts are a major factor in our global success.

**HYPRES, Inc.**

HYPRES is engaged in the development and commercialization of superconducting microelectronics. Superconducting integrated circuits (ICs) represent a significant advance over existing semiconductor technologies. HYPRES has established world-leadership in superconducting technology and is the only commercial supplier of primary voltage standard circuits used in metrology laboratories worldwide.

**IBM**

International Business Machines (IBM) is the world's top provider of computer hardware. The company makes a broad range of computers, including PCs, notebooks, mainframes, and network servers. It also develops software (ranking #2, behind Microsoft) and peripherals, and derives about 35% of sales from an ever-expanding service arm that is the largest in the world. IBM owns software pioneer Lotus Development, maker of the Lotus Notes messaging system. Subsidiary Tivoli Systems develops tools that manage corporate computer networks.

**Improv Systems, Inc.**

Improv is the industry's leading provider of 16 & 32 bit configurable DSP microprocessor solutions. The company licenses its high performance, programmable, configurable, scalable, synthesizable VLIW processors, peripherals, and system level chip designs to leading systems and semiconductor manufacturers. Improv also provides complete licensable application level solutions and comprehensive support required for system level integrated circuit development. Improv's DSP microprocessors are being designed into semiconductor products targeted at markets in consumer, multimedia, wired and wireless communications, networking, and security applications.

**Lockheed Martin****Lucid, Inc.**

Lucid, Inc. is a medical information company wholly dedicated to creating innovative cellular imaging technology and using the Internet to deliver accurate, real-time diagnostic information to medical professionals. Our ability to image living (in-vivo) and unprepared, excised (ex-vivo) tissue at the cellular level coupled with our Telepathology solutions aids medical practitioners and pathologists in cancer screening and the evaluation of other diseased tissues with clarity, speed, and patient comfort. We're breaking new ground in medical imaging and information technology everyday.

**OPTIPRO****PCB Piezotronics**

Founded in 1967, PCB Piezotronics is a well established, high technology company specializing in the development, production, and marketing of piezoelectric quartz, tourmaline, and ceramic sensors for measuring dynamic pressure, force, shock, and vibration. Our sensors are designed for applications ranging from the characterization of underwater blast wave propagation to detecting micro-g vibrations on the solar panels of orbiting satellites. In essence, any structure or event that vibrates, pulsates, moves, compresses, surges, or makes noise has the potential to be measured by these devices.

**Phillips Research****Photon Vision Systems LLC**

Photon Vision designs custom CMOS imagers that allow the highest integration of electronics to maximize the desired signal characteristics for a given application. Standard CMOS process allows for low engineering costs, quick design turn around and competition-beating pricing. CMOS imagers are based on the most common processes used at wafer foundries around the world for the most consistent and economical yields possible.

**Pike Company****Pixel Physics**

Pixel Physics is a contract research and development company specializing in digital and optical imaging systems for science and industry. From space-borne remote-sensing packages to industrial process flow or inspection monitoring systems, Pixel Physics has the ability to

understand complex problems, visualize solutions and construct applicable hardware or software to achieve superior results.

**Reveo, Inc**

Reveo, a frontier-technology research and development corporation, was founded by Dr. Sadeg Faris, a prolific inventor with over 100 patented inventions and a successful track record of taking new technologies to the marketplace. He established Reveo with the mission to develop inventions on the frontiers of science and technology and turn them into products for the benefit of humanity. Since commencing operations in 1991, Reveo has successfully completed numerous technology development contracts for federal agencies and Fortune 500 corporations. Reveo continues to expand contract research and development activities to help finance promising technologies.

**Rochester Photonics Corporation**

**Schlumberger ATE**

Schlumberger Semiconductor Solutions provides the world's most comprehensive systems and services for testing semiconductor devices. It also offers measurement systems for front-end applications, as well as equipment to test telecommunications network elements. The company provides technology leading, high quality, cost-effective solutions that help its customers meet their key test challenges. It has more than 200 customers across the globe, representing the world's largest, most recognized names in the electronics industry.

**Shandor Motion Systems**

**SMH Ophthalmology Department**

**Sonabilis**

**Sony**

Sony Corporation is a leading manufacturer of audio, video, communications, and information technology products for the consumer and professional markets. Its music, motion pictures, television production, computer entertainment operations and online businesses make Sony one of the most comprehensive entertainment companies in the world.

**SRC**

**STS Biopolymers**

**Tailored Lighting, Inc.**

The company was established to promote the use of the SoLux lighting system. SoLux is a revolutionary bulb technology that replicates sunlight by the regulation and distribution of the full color spectrum without releasing excess ultraviolet radiation that is damaging to color properties. The lighting system is currently used by museums, galleries, grocery stores, and textile industry to expose the true colors in products and displays.

**Target Vision**

**Tera Comm Research**

TeraComm Research, Inc. is developing what the company believes will be the world's fastest fiber-optic transmitter using high temperature superconductor (HTS) materials to modulate light. The superconductor optical transmitter is theoretically capable of data rates exceeding a terabit, or a trillion bits, per second on a single optical wavelength.

**The Boeing Company**

**Truth-N-Beauty**

**Vermeer Manufacturing Co.**

**Xerox Corporation**

At Xerox, we focus on the document. Document solutions consist of hardware, software, and services. They add value to organizations by improving the way knowledge is shared, business is done, and value is delivered. We've developed the world's most sophisticated and people-friendly technologies for managing and sharing knowledge. With our partner, Fuji Xerox, We're a \$26.2 billion Document company with global resources and the world's richest product and service portfolio: copiers, printers, scanners, desktop software, digital printing and publishing systems, supplies, and turnkey document-management and outsourcing services.

## **Appendix B.**

### **Academic Programs, Laboratories and Research Centers, Baccalaureate and Above**

#### **RIT Academic Programs**

##### **Digital Imaging and Publishing Technology**

<http://tiger.rit.edu>

College: NTID

###### **Description:**

Digital imaging and publishing is part of the broad graphic communications industry. Digital technology enables a multi-purposing of data, text, and graphics to meet the demand for publishing through a wide variety of information dissemination and communication strategies, including printed pages, World Wide Web pages, and CD-ROM.

###### **Degrees Offered:**

Diploma  
A.O.S. Associate in Occupational Studies  
A.A.S. Associate in Applied Sciences

Coop: YES

###### **Contact:**

Department Chair: Jean-Guy Naud,  
tel: (716)475-6309 (voice)  
fax: (716)475-5938  
e-mail: jennvc@rit.edu

###### **Address:**

Digital Imaging and Publishing Technology  
National Technical Institute for the Deaf  
52 Lomb Memorial Drive  
Rochester, NY 14623-5604

##### **Imaging and Photographic Technology**

<http://www.rit.edu/~661www>

College: CIAS

###### **Description:**

Imaging & Photographic Technology is a unique, applications-oriented program designed to prepare students for careers in a technical, industrial, or scientific environment. It combines a foundation in the traditional photographic materials and processes with specialized materials and processes with specialized studies in areas as diverse as electronic imaging, photo instrumentation, optics, photographic processing and video production.

###### **Degrees Offered:**

B.S. in Imaging & Photographic Technology

Coop: YES

###### **Contact:**

Department Chair: Andy Davidhazy,  
tel: (716)475-2592  
fax: (716)475-5804  
e-mail: andpph@rit.edu

###### **Address:**

Department of Imaging & Photographic Technology  
College of Imaging Arts & Sciences  
Rochester Institute of Technology

70 Lomb Memorial Drive  
Rochester, NY 14623-5604

### Imaging Science

<http://www.cis.rit.edu>

College: COS

#### Description:

Imaging science is the pursuit of a scientific understanding of imaging or an imaging technique. Today imaging is used by astronomers to map distant galaxies, oceanographers to map the sea floors, chemists to map the distribution of atoms on a surface, physicians to map the functionality of the brain, and electrical engineers to map the electromagnetic fields and power transmission lines. The nightly television new contains instantaneous radar based images of precipitation or three-dimensional views of cloud cover. Digital image processing (DIP) algorithms are available on personal computers and are being used to remove artistic flaws from digital and family photographs. The Chester F. Carlson Center for Imaging Science at RIT has a variety of educational options including the only Ph.D. program in the nation in Imaging Science.

Degrees Offered:  
B.S. in Imaging Science  
M.S. in Imaging Science  
M.S. in Color Science  
Ph.D. in Imaging Science  
(Short Courses and distance learning courses are available.)

Coop: YES

Contact:  
Director, Chester F. Carlson Center for Imaging Science:  
Dr. Ian Gatley,  
tel: (716)475-6220  
e-mail: [gatley@cis.rit.edu](mailto:gatley@cis.rit.edu)

B.S. in Imaging Science  
Program Coordinator: Professor Jon Arney,  
tel: (716)475-7322  
e-mail: [arney@cis.rit.edu](mailto:arney@cis.rit.edu)

M.S. in Imaging Science  
Program Coordinator: Dr. Harvey Rhody,  
tel: (716)475-6215  
e-mail: [rhody@cis.rit.edu](mailto:rhody@cis.rit.edu)

M.S. in Color Science  
Program Coordinator: Dr. Ethan Montag,  
tel: (716)475-5096  
e-mail: [montag@cis.rit.edu](mailto:montag@cis.rit.edu)

Ph.D. in Imaging Science  
Program Coordinator: Dr. Harvey Rhody  
tel: (716)475-6215  
e-mail: [rhody@cis.rit.edu](mailto:rhody@cis.rit.edu)

fax: for all 5 listed above (716)475-5988

Address:  
Chester F. Carlson Center for Imaging Science  
Rochester Institute of Technology  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

### Imaging Systems Management

<http://www.rit.edu/~wwwism>

College: CIAS

#### Description:

The Imaging Systems Management major at RIT is interdisciplinary with photographic technology, printing technology, information technology and operations management requirements. The core curriculum

stresses knowledge and skill development in photographic and digital image production systems and quality control, management for quality, and information technology and imaging.

Degrees Offered:  
B.S. in Imaging Systems Management

Coop: YES

Contact:  
Department Chair: Dr. Milton L. Cofield,  
tel: (716)475-2751  
fax: (716)475-7750  
e-mail: mlcpph@rit.edu

Address:  
Department of Imaging Systems Management  
College of Imaging Arts & Sciences  
Rochester Institute of Technology  
70 Lomb Memorial Drive  
Rochester, NY 14623-5604

### **Printing and Applied Computer Science**

<http://www.rit.edu/~spms>

College: CIAS

#### **Description:**

This program stresses the ways technology can be used to enhance the operations of companies in the graphic communications industry. The program combines printing courses with computer science, information technology and upper level science and mathematics courses, and prepares students for careers in computer systems management, data processing and analysis, custom software design, product development and marketing and sales for computer based printing equipment manufacturers and suppliers to the graphic communications industry.

Degrees Offered:  
B.S. in Printing and Applied Computer Science

Coop: YES

Contact:  
Chair: Frank Romano,  
tel: (716)475-7023  
fax: (716)475-7029  
e-mail: fxrppr@rit.edu

Address:  
Printing and Applied Computer Science  
College of Imaging Arts & Sciences  
69 Lomb Memorial Drive  
Rochester, NY 14623-5603

### **Printing Technology**

<http://www.rit.edu/~spms>

College: CIAS

#### **Description:**

This graduate program provides students with a comprehensive knowledge and understanding of the theoretical and practical aspects of graphic arts technology, and prepares graduates to approach solutions to printing problems through an orientation to processes and material based on systematic analysis. The program prepares students for positions in production management, research and development, technical sales, quality assurance, administration and marketing.

Degrees Offered:  
M.S. in Printing Technology

Coop: NO

Contact:



Coordinator: Len Leger,  
tel: (716)475-6026  
fax: (716)475-7029  
e-mail: lwlppr@rit.edu

Address:  
Printing Technology  
College of Imaging Arts & Sciences  
55 Lomb Memorial Drive  
Rochester, NY 14623-5603

## Product Development

<http://www.mpd.rit.edu>

College: COB / KGCOE

### Description:

This program is designed to prepare technical specialists for management and leadership roles in new product development. Offered only at RIT, MIT, and the University of Detroit-Mercy, the program is offered jointly by the Colleges of Business and Engineering, and focuses on the integrated systems perspective needed to commercialize increasingly complex products and systems for global leadership. In addition to required business and technical courses and a Capstone project, four electives enable participants to tailor the curriculum to meet organizational and career objectives. The program is offered in an "executive" format where students work full-time and attend classes one day per week. The two-year program begins each January and requires corporate sponsorship.

Degrees Offered:  
M.S. in Product Development

Coop: NO

Contact:  
Director: Mark Smith,  
tel: (716)475-7102  
fax: (716)475-7955  
e-mail: mwspd21@rit.edu

Address:  
Product Development  
College of Business & Engineering  
Rochester Institute of Technology  
111 Lomb Memorial Drive  
Rochester, NY 14623-5608

## RIT Research Centers, Laboratories, And Business Outreach Centers

### Center for Integrated Manufacturing Studies (CIMS)

<http://www.cims.rit.edu>

#### Description:

CIMS is a university-industry-government collaboration designed to increase the competitiveness of U.S. manufacturing companies in the global marketplace through applied technology and training. The Center provides technology and workforce development solutions that strengthen our industrial client's ability to compete in the global marketplace. In the last two years, CIMS has worked with over 1,000 companies; conducted more than 1,100 industrial projects; taught over 600 short courses for industry; and trained over 12,000 industry participants.

Within its 180,000 square feet of laboratories, training rooms and office space, CIMS houses five outreach-focused business units:

Center for Excellence in Lean Manufacturing  
Corporate Education and Training  
Manufacturing Technologies  
National Center for Remanufacturing and Resource

Recovery  
Printing Applications Laboratory

These units are staffed by over 70 full-time technical experts and training professionals, supported by over 70 faculty members of their project and training teams and over 50 co-op and part time students.

Contact:  
Director: William J. Sheeran,  
Assistant Vice President for Academic Affairs,  
tel: (716)475-7752  
fax: (716)475-5250  
e-mail: wjsasp@rit.edu

Address:  
Center for Integrated Manufacturing Studies  
111 Lomb Memorial Drive  
Rochester, NY 14623-5608

**Center for Excellence in Lean Manufacturing**

<http://www.cims.rit.edu/celm.html>

Description:

This Center for Excellence focuses on the application of lean techniques to the entire enterprise. Comprehensive training on lean topics centered around actual factory floor projects is provided. A key element of the Center is the focus on creating networks made up of practitioners from the community of regional companies involved in adopting lean concepts. Activities within these networks include tours of companies already implementing lean methodologies and the exchange of information, experiences, and concerns in focus groups.

Contact:  
Director: William J. Sheeran,  
Assistant Vice President for Academic Affairs,  
tel: (716)475-7752  
fax: (716)475-5250  
e-mail: wjsasp@rit.edu

Address:  
Center for Integrated Manufacturing Studies  
111 Lomb Memorial Drive  
Rochester, NY 14623-5608

**Corporate Education and Training (CET)**

<http://www.cims.rit.edu/cet.html>

Description:

CET specializes in providing organizations with learning solutions by world-class experts in engineering, science, imaging and publishing, computer technology, business, and more. CET's staff helps companies identify and fulfill their education and training needs to reach new levels of expertise and productivity through the development of customized training programs that are targeted to specific company needs.

Contact:  
Director: Kitren VanStrander,  
tel: (716)475-7054  
fax: (716)475-5571  
e-mail: kavcet@rit.edu

Address:  
Corporate Education & Training  
Center for Integrated Manufacturing Studies  
111 Lomb Memorial Drive  
Rochester, NY 14623-5608

**Manufacturing Technologies**

<http://www.cims.rit.edu/mt.html>

Description:

Helping manufacturers become competitive. Limited budgets, a lack of in-house expertise, and limited access to new technologies are some of the carriers manufacturers face in the race to be competitive. Manufacturing Technologies is committed to the advancement of manufacturers through technical assistance, and public and custom training opportunities. A staff of experienced industry engineers identify barriers to productivity and implement cost-effective solutions.

Contact:  
Director: Scott Bellinger,  
tel: (716)475-7551  
fax: (716)475-5250  
e-mail: dsb@rit.edu

Address:  
Manufacturing Technologies  
Center for Integrated Manufacturing Studies  
111 Lomb Memorial Drive  
Rochester, NY 14623-5608

### **Printing Applications Laboratory (PAL)**

<http://www.cims.rit.edu/pal.html>

#### Description:

RIT houses the most complete collection of contemporary printing equipment found anywhere in the world from conventional processes to state-of-the-art digital printing technology. This Lab serves as a resource to industry for research, evaluation and testing of substrates, printing materials and products, using flexible trial and evaluation platforms that can be tailored to specific company needs.

Contact:  
Director: Bill Garno,  
tel: (716)475-2609  
fax: (716)475-2690  
e-mail: wtgter@rit.edu

Address:  
School of Printing  
69 Lomb Memorial Drive  
Rochester, NY 14623-5608

### **Center for Multidisciplinary Studies (CMS)**

<http://www.rit.edu/~801www>

#### Description:

The Center for Multidisciplinary Studies provides courses and programs (graduate and undergraduate) specifically designed to meet the multidisciplinary learning needs of the adult, part-time student. The Center for Multidisciplinary Studies specializes in offering customizable, flexible programs tailored to interests of individual students (or their employers), or contact programs to corporations that meet the strategic learning needs of an organization. All programs offered through CMS have unique content forged from multidisciplinary roots and collaborative programming partnerships with departments across RIT. Students can earn degrees, diplomas, and certificates through a variety of ways including online (distance) learning.

Contact:  
Linda A. Tolan,  
Associate Dean and Interim Director  
tel: (716)475-5078  
e-mail: latcad@rit.edu  
or tel: (716)475-2234  
TTY: (716)475-7256  
fax: (716)475-6292  
e-mail: cms@rit.edu

Address:  
Center for Multidisciplinary Studies  
George Eastman Building  
31 Lomb Memorial Drive  
Rochester, NY 14623-5603

**Chester F. Carlson Center for Imaging Science (CIS)**

<http://www.cis.rit.edu>

Description:

The Chester F. Carlson Center for Imaging Science has 36 research and teaching laboratories dedicated to specialized areas of imaging science, including electronic imaging, digital image processing, remote sensing, medical imaging, color science, optics, and chemical imaging. The industrial associates program engages the Center with companies within the imaging industry to build a program which prepares the superb problem-solving people needed to explore the frontiers of imaging science. Representatives from industry advise the Center on what skills and attributes the company needs in the employees it hires. Scientists from industrial associate member companies interact with current imaging science students through campus recruiting events, guest lectures, seminar presentations and informal mentoring. Industrial research projects offer real problems for students to solve in collaboration with industry staff and Center faculty. The Center is also a partner in the New York State Center for Electronic Imaging Systems (CEIS), which conducts applied research in collaboration with large and small companies in the imaging industry.

Contact:

Director: Dr. Ian Gately,  
tel: (716)475-6220  
fax: (716)475-5988  
e-mail: ixgpci@rit.edu

Address:

Chester F. Carlson Center for Imaging Science  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Digital Imaging and Remote Sensing (DIRS) Laboratory**

<http://www.cis.rit.edu/research>

Description:

The mission of this lab is to educate imaging science students in the field of remote sensing and to conduct cutting edge research. Research activities in the DIRS lab focus primarily on two areas. The first involves design of instrumentation to image the earth and development of methods to extract quantitative information from remotely sensed data. The second involves development of methods to generate synthetic images of what the earth would

look like to airborne or satellite imaging systems. In order to meet a growing need within the remote sensing community, DIRS has established the Laboratory for Advanced Spectral Sensing (LASS), which is described below.

Contact:

Director: John R. Schott, Ph.D.,  
tel: (716)475-5170  
fax: (716)475-5988  
e-mail: jrspci@rit.edu

Address:

Digital Imaging & Remote Sensing Laboratory  
Chester F. Carlson Center for Imaging Science  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Digital Imaging Restoration Laboratory**

<http://www.cis.rit.edu/research>

Description:

The mission of this laboratory is to apply digital imaging algorithms and technologies to clarify ancient documents such as the Dead Sea Scolls, including text material written on parchment and papyrus and on and within clay tablets. Imaging technologies including digital electronic cameras and zerographic printers are used to gather and print images, and image processing algorithms are developed and applied for monochrome, color, and multispectral images.

Contact:

Director: Roger Easton,  
tel: (716)475-5969  
fax: (716)475-5988

e-mail: rlepci@rit.edu

Address:  
Digital Imaging Restoration Laboratory  
Chester F. Carlson Center for Imaging Science  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Laboratory for Advanced Spectral Sensing (LASS)**

<http://www.cis.rit.edu/research>

Description:

This lab was established as a resource to partner closely with industry and government agencies that require further training or specific research in the field of spectral remote sensing. Most new airborne or satellite remote sensing systems are transitioning themselves from capturing literal images (such as black and white photographs) to instruments that can broadly interrogate the electromagnetic spectrum. LASS conducts sponsored research that is designed to explore and extend the benefits of remote spectral sensing, and through its Board of Advisors solicits input from industry and government on emerging trends, personnel and research needs in the remote sensing field.

Contact:  
John R. Schott, Ph.D.,  
tel: (716)475-5170  
e-mail: jrspci@rit.edu

Michael Richardson  
tel: (716)475-5294  
e-mail: richardson@cis.rit.edu

fax: for both (716)475-5250

Address:  
Laboratory for Advanced Spectral Sensing  
Chester F. Carlson Center for Imaging Science  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Microdensitometry Laboratory**

<http://www.cis.rit.edu/research/md.shtml>

Description:

The focus of the work in the Microdensitometry Laboratory is on understanding the mechanisms involved in the interaction between ink, paper, and light. These studies involve the measurement of the distribution of light reflected from images produced by a variety of processes ranging from traditional lithographic printing to digital printers such as ink jet, laser, and thermal transfer. By examining carefully printed "test targets", information about the scatter of light within the paper, the spreading of inks on paper, the penetration of inks into the paper, and the variability of the printing process can be measured and understood quantitatively.

Contact:  
Director: Jonathan Arney,  
tel: (716)475-7322  
fax: (716)475-5988  
e-mail: jsapci@rit.edu

Address:  
Microdensitometry Laboratory  
Chester F. Carlson Center for Imaging Science  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Munsell Color Science Laboratory (MCSL)**

<http://www.cis.rit.edu/mcsl>

Description:

Munsell Color Science Laboratory (MCSL) is one of the world's premier academic laboratories dedicated to research and education in Color Science. Focus areas include education and research in areas of color perception, color measurement, color formulation, and color reproduction.

Contact:  
Director: Mark D. Fairchils, Ph.D.,  
tel: (716)475-2784  
fax: (716)475-5988  
e-mail: mdf@cis.rit.edu

Address:  
Munsell Color Science Laboratory  
54 Lomb Memorial Drive  
Rochester, NY 14623-5604

**The John D. Hromi Center for Quality & Applied Statistics (CQAS)** <http://www.rit.edu/eng/cqas>

Description:

This Center is internationally recognized for graduate education, training and consulting programs in principles and approaches related to applied statistics and quality in manufacturing and service industries. CQAS presents a range of non-credit seminars on topics including statistical analysis, design of experiments, robust design, reliability, six sigma, quality standards, and management for quality. The faculty of the Center is a distinguished group that includes winners of the American Society for Quality's Shewhart Medal, Grant Award, Brumbaugh Award, and Shewell Award; a past president of the society; and fellows of ASQ and the American Statistical Association.

Contact:  
Director: Donald Baker,  
tel: (716)475-5070  
fax: (716)475-5959  
e-mail: ddbca@rit.edu

Address:  
John D. Hromi Center for Quality and Applied Statistics  
Rochester Institute of Technology  
98 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Image Permanence Institute (IPI)**

<http://www.rit.edu/ipi>

Description:

The Image Performance Institute (IPI) is a university-based, non-profit research laboratory devoted to scientific research in the preservation of visual and other forms of recorded information. IPI is the world's largest independent laboratory with this specific scope. IPI was founded in 1985 through the combined efforts and sponsorship of Rochester Institute of Technology (RIT) and the Society for Imaging Science and Technology (IS&T).

Contact:  
Director: Jim Reilly,  
tel: (716)475-2306  
fax: (716)475-7230  
e-mail: jmrph@rit.edu

Address:  
Image Permanence Institute  
Rochester Institute of Technology  
70 Lomb Memorial Drive  
Rochester, NY 14623-5604

**IT Lab**

<http://www.it.rit.edu>

Description:

The IT Lab is a multidisciplinary campus resource that explores and develops innovative applications of emerging IT technologies. The Lab's work is centered on sponsored projects conducted collaboratively with business and government agencies. The Lab is housed within the College of Applied Science and Technology and supports RIT faculty and student participation in its activities. In addition, the lab offers educational programs to assist IT professionals to maintain current awareness and to enhance skill sets. Areas of special interest include communications infrastructure, wireline and wireless networked

applications, middleware technology and software integration, 3-D graphics, and systems to support hearing impaired persons.

Contact:

Director: Jeffery Lasky,  
tel: (716)475-2284  
fax: (716)475-2181  
e-mail: jal@it.rit.edu

Address:

IT Lab  
102 Lomb Memorial Drive  
Rochester, NY 14623-5608

**NTID High Technology Center for Electronic Publishing and Imaging**

<http://htc.rit.edu>

Description:

The Center serves the training needs of deaf students at the National Institute for the Deaf (NTID), the world's largest technical training program for the deaf, as well as professionals from the printing, graphic arts and imaging industries who come for short-term training programs, workshops, seminars, and conferences. The Center is multi-platform, housing Apple Macintosh and H-P PC-compatible computers, and Sun workstations. The Center supports two academic programs (Digital Imaging and Publishing Technology and Applied Art and Computer Graphics). The Center houses state of the art equipment and technologies, and serves as a testbed for the introduction of these technologies, on a fast-track basis, into the curriculum.

Contact:

Director: Mike Kleper,  
tel: (716)475-2773  
fax: (716)475-7087  
e-mail: mlknvc@rit.edu

Address:

NTID High Technology Center for Electronic Publishing and  
Imaging  
National Institute for the Deaf  
70 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Office of Cooperative Education and Career Services**

<http://www.rit.edu/co-op/careers>

Description:

RIT's Office of Cooperative Education and Career Services provides a full array of programs and activities to assist

companies in meeting their high-tech staffing needs. This office can help firms identify and recruit graduating students and alumni with the academic background and experience they need most. Of particular value to interested companies may be RIT's cooperative education program, one of the largest and oldest in the world, which allows companies to employ students on a full-time basis for three to six month work assignments while the

students are completing their course of study. This office can also help you find part-time students employees through the Student Employment Program. All that is needed to get started is a job description.

Contact:

Director: Manny Contomanolis,  
tel: (716)475-5464  
TTY: (716)475-6905  
fax: (716)475-5476  
e-mail: exc4157@rit.edu

Address:

Office of Cooperative Education and Career Services  
Bausch & Lomb Center  
Rochester Institute of Technology  
57 Lomb Memorial Drive

Rochester, NY 14623-5608

**Office of Part-time Enrollment Services**

<http://www.rit.edu/parttime>

**Description:**

This office provides centralized information and counseling services for students and employees interesting in part-time undergraduate studies. Each of RIT's colleges offers part-time students a wide range of academic programs during daytime hours. In addition, most of the colleges provide selected evening programs for those who need to convenience of attending classes evenings, Saturdays or through online (distance) learning. Each of the five major interest areas have degree programs available at the undergraduate level: Business, Management and Human Services; Computing, Engineering and Engineering Technology; Allied Health and Science; Fine Arts, Printing and Communications and Multidisciplinary/General Studies.

**Contact:**

Director: Joseph Nairn,  
tel: (716)475-2229  
fax: (716)475-7165  
e-mail: opes@rit.edu

**Address:**

Office of Part-time Enrollment Services  
Bausch & Lomb Center  
58 Lomb Memorial Drive  
Rochester, NY 14623-5604

**Online Learning**

<http://www.distancelearning.rit.edu>

**Description:**

Rochester Institute of Technology (RIT) is the third largest distance learning degree and program provider in the U.S. With over 6,300 enrollments and 20 years of experience, RIT offers students the benefits of anytime/anywhere education. With online student services such as advising, course materials, and library access available, RIT's format is designed to enable adults with professional and personal obligations to complete a full graduate or undergraduate degree without coming to campus. RIT online learning degrees offer the same high quality as on campus programs with the added flexibility of allowing the student to learn at a time that is convenient for them. Online Learning at RIT offers eight graduate degrees, five undergraduate degrees, nineteen certificates and over 310 course online. All online learning programs have the same accreditation as on-campus programs. In addition to institutional accreditation, many curricula in the colleges are also accredited by professional accreditation bodies. Online Learning at RIT will work with corporations to design customized online college programs.

**Graduate Degrees:**

M.S. in Applied Statistics  
M.S. in Cross-Disciplinary Professional Studies  
M.S. in Environmental, Health and Safety Management  
M.S. in Health Systems Administration  
M.S. in Imaging Science  
M.S. in Microelectronics Manufacturing  
M.S. in Information Technology  
M.S. in Software Development and Management

**Graduate Certificates:**

Health Systems Finance  
Integrated Health Systems  
Statistical Quality

**Undergraduate Degrees:**

B.S. in Applied Arts and Science  
B.S. in Electrical/Mechanical Engineering Technology  
B.S. in Environmental Management and Technology  
B.S. in Telecommunications Engineering Technology  
B.S. in Safety and Technology

**Undergraduate Certificates:**

Disaster and Emergency Management



Digital Imaging and Publishing  
E-Business\*  
Environmental Management and Technology  
-Environmental Management Science and Industrial Environmental Management  
Health Systems Administration  
Organizational Change  
Quality Management  
-Basic Quality and Quality Implementation  
Safety Technology  
Structural Design  
Technical Communication  
-Basic Technical Communication and Advanced Technical Communications  
Telecommunications  
-Data Communications, Network Management and Voice Communications

\*Pending approval by N.Y. State Department of Education

Contact:  
Contact: Karen Vignare,  
Online Learning at RIT Tel: (716)475-5089  
e-mail: kxvrpt@rit.edu  
or 1-800-CALL-RIT  
TTY: (716)475-5896  
fax: (716)475-5077

Address:  
RIT Online Learning  
91 Lomb Memorial Drive  
Rochester, NY 14623-5603

### **RIT Research Corporation**

<http://www.ritrc.edu>

#### Description:

RIT Research Corporation is a for-profit wholly owned subsidiary of Rochester Institute of Technology (RIT). Its work is focused on advancing the research, development and commercialization of imaging and information systems for business, industry and government. Celebrating its twentieth anniversary this year, the Research Corporation has a client base that spans the globe. Areas of expertise include: color imaging and printing; imaging software; color science; variable printing and digital workflow; networked knowledge applications; data capture and analysis; and image information processing. Combining these disciplines into a complete system results in a comprehensive and objective understanding of customer's goals and how to achieve them. Projects can span the entire product development process, including prototyping and specifications; product and system design; and development and testing. Specific systems development skills include mechanical, electrical, optical, chemical and software engineering; mathematical modeling of mechanisms and systems; image science; product and systems reliability calculations; maintenance and serviceability engineering; state-of-the-art imaging technology development; and materials design. RIT Research Corporation is in the process of putting together a working laboratory for companies and governments worldwide to view solutions to their data capture business problems, called the Electronic Data Capture and Analysis Lab.

Contact:  
Bill Trachtenberg, President,  
tel: (716)239-6037  
fax: (716)239-6019  
e-mail: bxtrc@rc.rit.edu

Charles Broersma, Director,  
Business Development,  
tel: (716)239-6012  
fax: (716)239-6019  
e-mail: cbbrc@rc.rit.edu

Address:  
RIT Research Corporation  
125 Tech Park Drive  
Rochester, NY 14623

### **Technology Management Center**

#### Description:

This Center promotes and sponsors applied research in four areas: 1) management of new product development; 2) information technology management; 3) science & technology policy; and 4) high technology start-up enterprises. Activities include the New Product Development Forum, which is supported by seven regional companies and conducts periodic conferences and workshops on technology management issues.

Contact:  
Director: John Ettlie, Ph.D.,  
tel: (716)475-7789  
fax: (716)475-7055  
e-mail: jeebbu@rit.edu

Address:  
Technology Management Center  
College of Business  
Rochester Institute of Technology  
107 Lomb Memorial Drive  
Rochester, NY 14623-5608

## **University of Rochester Programs**

### **BS**

From: [http://xray.optics.rochester.edu:8080/academic\\_programs/bs/bs\\_degree.html](http://xray.optics.rochester.edu:8080/academic_programs/bs/bs_degree.html)

Bachelor of Science Degree in Optics  
Institute of Optics  
University of Rochester

#### Major Requirements

OPT 223 Quantum Theory of Optics  
OPT 224 Laser Systems  
OPT 226 Optoelectronics I  
OPT 241 Geometrical Optics  
OPT 242 Aberrations and Testing  
OPT 256 Laboratory  
OPT 261 Interference & Diffraction  
OPT 262 Electromagnetic Theory  
OPT 300 Senior Seminar (2 credits)

#### Foundation Requirements for Major

Computer Programming - C++ is most useful in Optics (e.g.  
ECE 171 or ME 211)  
One semester of Chemistry CHM 131 or 151 (4 or 5 AP score  
satisfies)  
Calculus MTH 161 and 162 (AP scores may give credit &/or

placement)  
Differential Equations MTH 163  
Multidimensional Analysis MTH 164  
Fourier Series MTH 281  
Complex Variables & Applications MTH 282  
Physics PHY 121 - 123, or 141 - 143  
Circuits - most students take ECE 210, which also fulfills a  
technical elective  
2 Technical Electives - may be in Optics, Engineering, Math, or  
other area of sciences

(General) Degree Foundation Requirements

Reason and Writing - CAS 105 (a basic writing course)  
One cluster in humanities  
One cluster in social science

Minors or second majors in each of these areas also satisfy these  
two degree requirements

And a total of 130 credits

From: [http://xray.optics.rochester.edu:8080/academic\\_programs/bs/bs\\_courses.html](http://xray.optics.rochester.edu:8080/academic_programs/bs/bs_courses.html)  
Courses

OPT 100 Introduction to Optics  
OPT 110Q Clockwork to Chaos  
OPT 223 Quantum Theory of Optical Materials and Devices  
OPT 224 Laser Systems  
OPT 226 Optoelectronics I: Devices  
OPT 232 Optomechanical Design  
OPT 241 Geometrical Optics  
OPT 242 Aberrations, Interferometry and Testing  
OPT 243 Optical Fabrication and Testing Laboratory  
OPT 246 Optical Interference Coating Technology  
OPT 256 Optics Laboratory  
OPT 261 Interference and Diffraction  
OPT 262 Electromagnetic Theory  
OPT 300 Current Optics and Optics Technology  
OPT 391 Independent Reading  
OPT 392 Special Topics  
OPT 393 Special Essay  
OPT 395 Undergraduate Research Projects  
OPT 396 Honors Projects  
OPT 397 Engineering Clinics Course

**M.S. Program Outline**

The M.S. degree can be completed in nine months by electing the coursework-only option, which requires a total of eight courses and an exam. Two other options, the thesis option and the M.S. Co-Op option (which includes a 12-month work block in the optics industry), each require two years to complete. At the present time, those with an M.S. degree in Optics are being eagerly recruited by industry. The number of job and career opportunities available is significantly greater than the number of M.S. degrees we grant each year.

Our current course offerings include:

Mathematical Methods  
Radiation and Detectors  
Optical Communications  
Geometrical Optics

- Physical Optics
- Physical Optics II: Electrodynamics
- Medical Optics
- Optical Interference Coatings
- Nonlinear Optics
- Quantum Electronics I & II
- Waveguide Optoelectronic Devices
- Quantum Mechanics for Optics
- Optical Properties of Semiconductors
- Instrumental Optics
- Optical Fabrication and Testing
- Lens Design
- Principles of Eye Design
- Electromagnetic Theory
- Lasers and Laser Systems
- Theory of Optoelectronic Systems
- Nano-Optics
- Modern Coherence Theory
- Optics Laboratory

<http://www.optics.rochester.edu:8080/>

### **PhD Program Outline**

Founded in 1929, The Institute of Optics offers extensive graduate coursework and research in a wide variety of areas of optical science and engineering. Our course offerings in the 2000-01 academic year include:

- OPT 411 Mathematical Methods
- OPT 412 Quantum Mechanics for Optics
- OPT 421 Optical Properties of Semiconductors
- OPT 425 Radiation and Detectors
- OPT 428 Optical Communication Systems
- OPT 441 Geometrical and Instrumental Optics I
- OPT 442 Geometrical and Instrumental Optics II
- OPT 443 Optical Fabrication and Testing Technology
- OPT 444 Lens Design
- OPT 448 Principles of Eye Design
- OPT 461 Physical Optics I
- OPT 462 Physical Optics II
- OPT 465 Laser Systems
- OPT 467 Nonlinear Optics
- OPT 492 Optical Interference Coating Technology
- OPT 492 Medical Optics
- OPT 551 Quantum Electronics I
- OPT 552 Quantum Electronics II
- OPT 562 Advanced Physical Optics - Scattering of Light
- OPT 564 Theory of Optoelectronic Systems
- OPT 568 Waveguide Optoelectronic Devices
- OPT 592 Nano Optics
- OPT 5xx Modern Coherence Theory

Admission to the Ph.D. program is very competitive, with approximately 12 students admitted each year. The first-year coursework assumes no prior experience with Optics, but assumes a level of mathematical and scientific preparation consistent with a B.S. degree in Physics, Applied Physics, or Electrical Engineering. Brief descriptions of The Institute's faculty, their research interests, and their e-mail addresses can be found by selecting The Optics Faculty: Short Descriptions. The industrial job market is currently very strong. The academic job market is less strong, but still very good as many departments throughout the U.S. seek to add faculty with specialties in optics.

<http://www.optics.rochester.edu:8080/>

### **Rochester Theory Center for Optical Science and Engineering**

From: <http://www.rochester.edu/College/RTC/>

The Rochester Theory Center for Optical Science and Engineering was established at the University of Rochester, Department of Physics and Astronomy and began operation with funding from the National Science Foundation in the second half of 1995. The Center has several mandates, the principal one being to provide post-doctoral training in frontier areas of optical science and technology. This will be done by awarding Postdoctoral Fellowships to selected young Ph.D. theorists from US universities. Application procedures for these fellowships are described elsewhere at this web site. Applicants must have received their Ph.D. degree from a US university within the past 3 years. There will be a preference for applicants whose thesis work was not in optical science or engineering. The research projects of current interest at the Center and the names of the Center's permanent senior members can also be found at this web site. In addition to postdoctoral research, the Center's activities include occasional topical workshops, extended visits by senior visiting experts, and joint projects including off-site work experiences with industrial partners of the Center.

Questions: e-mail [secr@rtc.rochester.edu](mailto:secr@rtc.rochester.edu)

## **U of R Research Centers, Laboratories and Business Outreach Centers**

### **The Center for Optics Manufacturing (COM)**

<http://www.opticam.rochester.edu/content/contents.htm>

The Center for Optics Manufacturing (COM) is the nucleus of a nationally supported research and development alliance that is modernizing precision optics manufacturing technology.

The Center is a partnership of the American Precision Optics Manufacturers Association (APOMA), several universities (Rochester, Central Florida and Arizona) and the U.S. Army. This award-winning cooperative effort is developing real-world technology solutions that are redefining industry manufacturing capability.

### **Center for Photoinduced Charge Transfer**

<http://www.chem.rochester.edu/~stc/home.html>

The Center for Photoinduced Charge Transfer (CPCT) was founded in 1989 as one of the eleven original NSF Science and Technology Centers with a mission to pursue fundamental research in the area of photoinduced charge transfer through a unique university-industrial collaboration involving the University of Rochester, Eastman Kodak, and Xerox. Photoinduced charge transfer is the fundamental process by which light energy is converted

to potential energy associated with separation of electrical charge. It is the key step in photography, xerography, solar energy conversion, and photosynthesis. The CPCT is dedicated to understanding the underlying chemistry and physics of photoinduced charge transfer processes...

The Center is currently funded by a combination of federal, University, and industrial sources. It retains access to a broad range of technical expertise with continuing multi-disciplinary interactions with Biology, Physics, Engineering, and the University of Rochester Medical Center. This allows scientists to combine forces on challenging problems of mutual interest and make rapid progress towards their research goals.

### **The Laboratory for Laser Energetics**

<http://www.lle.rochester.edu/>

The Laboratory for Laser Energetics of the University of Rochester is a unique national resource for research and education in advanced laser and optical sciences, technologies, and applications. The Laboratory, which includes a staff of more than 160 scientists, engineers, and technical and administrative support personnel, is located on the University's South Campus. It is housed in the 100,000-square-foot building shown on the cover photograph and is adjacent to the University's recently constructed Center for Optoelectronics and Imaging.

The University of Rochester is one of the leading research universities in the United States and has major research programs in areas ranging from high-energy physics to molecular biology. The Laboratory for Laser Energetics (LLE) is one of the largest research units of the University and accounts for approximately 13% of the University’s research expenditures. LLE is a unique national resource dedicated to research and education in all aspects of laser–matter interaction. The Laboratory is considered a major University Research Laboratory, and the Director of LLE reports directly to the Provost. Academically, the Laboratory is a non-degree-granting division of the University of Rochester.

LLE is well positioned to provide industry with state-of-the-art technology resources in laser applications and technology unequaled in any other major university. Since its inception in 1970, LLE has paved new ground in the interaction of university laboratories with industry. LLE’s Advanced Technology Research Groups have honed their capabilities by tackling and solving some of the most challenging problems facing science and technology today.

**Telephone Directory**

**Laboratory for Laser Energetics (LLE)**

- Robert L. McCrory (Professor and Director, LLE) ..... (716) 275-4973
- Charles P. Verdon (Deputy Director, LLE; Director, Theoretical Division) ..... (716) 275-5877
- Steven J. Loucks (Director, Engineering and Administrative Divisions) ..... (716) 275-2393
- Wolf Seka (Director, Experimental Division) ..... (716) 275-3815
- Laboratory for Laser Energetics..... (716) 275-5101

**LLE–Industry Partnership Program**

- John M. Soures (Manager) ..... (716) 275-3866
- E-mail ..... jsou@lle.rochester.edu
- Jean Steve (Administrative Liaison) ..... (716) 275-5286
- E-mail ..... jste@lle.rochester.edu
- Facsimile ..... (716) 256-2586

Worldwide-Web Home Page:

**University of Rochester  
Laboratory for Laser Energetics  
250 East River Road  
Rochester, NY 14623-1299**

## **Appendix C.**

### **Monroe Community College Academic Programs**

#### **OPTICAL SYSTEMS TECHNOLOGY CERTIFICATE PROGRAM**

**Description:**

The Optical Technology Certificate Program prepares students to work in optical activities, such as testing, quality control, and production. It provides a background in optics using the eye as a detector, but not incorporating the peripheral disciplines, such as electronics and photography, as offered in the A.A.S. curriculum in Optics.

This certificate program is designed for people working in the field, or in an allied field, who wish to add optics to their sphere of competence. All courses shall be applicable to the A.A.S. degree should the student wish to continue his/her education in Optical Engineering Technology.

#### **OPTICAL SYSTEMS TECHNOLOGY A.A.S. DEGREE**

**Description:**

The Optical Systems Technology degree offers a unique, comprehensive program which prepares graduates for work in high technology fields which apply light and optical principles in their operations. The curriculum combines the study of optics with electronics for careers in electro-optics or allows a traditional optics option.

The optical systems technician works with scientists and engineers in research, development, design, production, quality control, test, and evaluation of optical components and systems, as well as sales and service. The course of study gives the student opportunity to work with and operate much of the precision equipment and technology used in today's field of electro-optical systems.

Students should meet regularly with their program advisor to make certain that their course selections meet the requirements of the program and their career choices.

Recommended preparation: Three years of high school mathematics are required through Sequential Math III (Regents level strongly recommended), and one-half year of physics or physical science is recommended.

#### **MANUFACTURING TECHNOLOGY--ROBOTICS/AUTOMATION A.A.S. DEGREE**

**Description:**

The Manufacturing Technology: Robotics/Automation program exposes the student to the vast field of manufacturing. The program covers areas such as manufacturing processes, robotics, and design of equipment and factories. Computer Integrated Manufacturing (CIM) concepts are presented and practiced in hands-on laboratory courses.

In the third and fourth semesters of this program, the student can choose to specialize in Robotics, Electro-Mechanics, Quality Control, Instrumentation and Process Control, Plastics, or Optics.

Students can be placed directly in positions as technicians in manufacturing, process, plant and facilities engineering departments.

### **INDUSTRIAL INSTRUMENTATION TECHNOLOGY**

#### **A.A.S. DEGREE**

Description:

Instrumentation Technology is a relatively new career field which draws upon basic knowledge in the physical sciences and the applied sciences of engineering, optics, and electronics. Essentially, Instrumentation Technology is the study of fundamental principles of physical measurement and automatic control in electrical, mechanical, pneumatic, and hydraulic systems.

Instrumentation is essential to all industries. Specific examples include the process industries, such as film manufacturing, petroleum refining, chemical processing, food processing, and paper-making; industries which manufacture instrumentation equipment, or products which incorporate instrumentation equipment; public utilities; and aerospace industries. In the near future, instrumentation will play a vital role in resolving such major public problems as sewage control, air and water pollution, improvement of mass transportation systems, expansion and modernization of public water supplies, and furthering the studies of the human body as a physical process.

### **ENGINEERING SCIENCE**

#### **A.S. DEGREE**

Description:

The College participates in the plan for uniform curriculum and admissions requirements prescribed by the Two-Year Engineering Science Association of New York (TYESA), in collaboration with other two-year colleges of the State University of New York. The uniform requirements have been imposed to facilitate transfer to baccalaureate engineering programs.

### **INDUSTRIAL INSTRUMENTATION TECHNOLOGY**

#### **CERTIFICATE PROGRAM**

Description:

The Instrumentation Technology Certificate Program is offered to those who desire specialization in the technology in a short program of instruction. The certificate was designed to meet the needs of those who have entered the field of instrumentation or wish to enter the field.

Students desiring to enter the certificate program are requested to meet with the Department Chairperson to review qualifications and career goals. Several of the courses below have prerequisites which must be met by taking courses or challenge examinations.

### **ELECTRO-OPTICS TECHNOLOGY**

#### **A.A.S. DEGREE**

Description:

(SEE OPTICAL SYSTEMS TECHNOLOGY)

### **Contract Training**

From top to bottom, a well-trained workforce contributes to the competitive advantage of Rochester businesses, companies, and service organizations. MCC's Office of Workforce Development can work with your organization for the design, development, and delivery of continuous improvement in workforce performance and productivity. Put MCC into your employee development business plan. Monroe Community College provides training programs that are customized to meet your company's needs.



Working with you, MCC helps you determine your training needs, designs programs to meet these needs, if necessary, locates resources outside of MCC to assist you, and evaluates the effectiveness of the program. MCC has expertise in a large number of areas to assist you including: apprentice training, supervisory skills, technical skills (mechanical, electronic, computer, optics, and many others), professional food management, finance, accounting, automotive, tooling and machining, and many more.

**Contract Credit**

Contract credit is a college credit bearing, programmatic approach to the education of employees in which the college and the company select and design curricula to meet the business goals of the company through the development of its employees in a contractual agreement between a college and the company. All college academic standards are maintained. Through contract credit, Monroe Community College provides credit programs on-site at several company locations. MCC can provide a single course for your employees, or can work with you to create a certificate or degree program that develops your organization. We offer: Customer-specific courses and programs for Quality Training to Technical Courseware in PC Applications, GD&T, Design for Manufacturability, Business, Communications, Supplier Training, HVAC and Health Fields, Instructional and Assessment resources, Cost-effective contract and open enrollment opportunities, flexible scheduling, delivery on-site and/or at MCC facilities  
<http://www.monroecc.edu/>

## **Appendix D.**

### **Professional Organizations with Significant Rochester Membership**

<b>Central New York APOMA Members</b>		
<b>COMPANY NAME</b>	<b>PHONE</b>	<b>CITY</b>
<b>ACCUCOAT, INC</b>	(716) 288-2330	Rochester
<b>ADVANCED GLASS INDUSTRIES</b>	(716) 458-8040	Rochester
<b>CENTER FOR OPTICS MANUFACTURING</b>	(716) 275-1093	Rochester
<b>CHAPMAN INSTRUMENTS</b>	(716) 424-1380	Rochester
<b>CORNING INC.</b>	(607) 974-3594	Corning
<b>CORNING INC.</b>	(315) 379-3253	Canton
<b>EASTMAN KODAK CO.</b>	(716) 726-6438	Rochester
<b>FISBA OPTIK</b>	(716) 427-9155	Rochester
<b>GLASS FAB INC.</b>	(716) 262-4000	Rochester
<b>G-S PLASTIC OPTICS, INC.</b>	(716) 232-1440	Rochester
<b>HOLOTEK</b>	(716) 321-6000	Henrietta
<b>JML OPTICAL INDUSTRIES</b>	(716) 342-8900	Rochester
<b>LIGHTWAVE ENTERPRISES INC.</b>	(716) 426-0910	Henrietta
<b>MELLES GRIOT, OPTICS DIVISION</b>	(716) 244-7220	Rochester
<b>MONROE COMMUNITY COLLEGE</b>	(716) 292-2676	Rochester
<b>OPTICS TECHNOLOGY, INC.</b>	(716) 586-0950	Pittsford
<b>QED TECHNOLOGIES LLC</b>	(716) 256-6540	Rochester
<b>REFLEXITE</b>	(716) 272-0309	W. Henrietta
<b>RESULTANT MANUFACTURING SERVICES</b>	(315) 986-8419	Walworth
<b>ROCHESTER PHOTONICS CORP.</b>	(716) 272-3010	Rochester
<b>SCHNEIDER OPTICAL MACHINES INC, LLC</b>	(716) 292-6480	Rochester
<b>SINCLAIR OPTICS</b>	(716) 425-4380	Fairport
<b>STEFAN SYDOR OPTICS, INC.</b>	(716) 271-7300	Rochester

## **Photonics Industry Association of New York (PIANY)**

From: <http://www.pianyny.org/>

The Photonics Industry Association of New York, Inc. (PIANY) is a not-for-profit organization dedicated to the growth of the photonics, optics, and imaging industry of New York State. Its purposes are to:

- Stimulate the growth of forums for exchanging views and disseminating information between and among photonics companies, research institutions, and governmental entities.
- Foster collaborative research in and development of photonics, technology, systems, and applications.
- Identify industry-wide workforce training and education needs.
- Facilitate industry participation in the formulation and implementation of technical standards and the development of public policy.
- Lead the industry in apprising New York State residents and their elected officials of the pervasiveness of photonics technology and the growing value of the photonics industry to the State's future economic well-being.

From: <http://www.pianyny.org/contact.html>

Executive Director

Office Manager

Fax

Phone

E-mail

Mailing Address

Photonics Industry Association of New York, Inc.

1101 Floyd Avenue

Rome, NY 13440

George (Bud) Hippisley

Margaret (Peggy) Bartell

(315) 336-5014

1-877-742-6969, (315) 339-9910

piany@telenet.net

## **SPIE- The International Society for Optical Engineering**

From: <http://www.spie.org/>

From: <http://www.spie.org/Announcements/index.html#Creating>

SPIE/OSA Optics Education Blueprint workshops complete  
6 December 2001

SPIE and OSA completed their workshop series to develop an Optics Education Blueprint for the 21st Century. The final workshop, held 10 November in Washington, DC at OSA Headquarters, attracted 29 participants from a diverse community of formal and informal engineering and science educators, education policy and science and engineering organizations.

SPIE received funding from the National Science Foundation for a planning grant to support a series of workshops addressing informal science education in optics. The planning grant of \$48,725 is supporting expenses related to this and two other 2001 workshops held in San Diego (July), Tucson (September), and Washington DC (November).

The workshops and planning activity are being sponsored jointly by SPIE and the Optical Society of America, with the goal to develop a joint society long-range strategy to stimulate informal optics education programs. A final

report, pending, will be submitted to the National Science Foundation and to SPIE and OSA committee members and leadership for further action.

## **Optical Society of America**

From: <http://www.osa.org/aboutosa/>

Founded in 1916, the Optical Society of America (OSA) was organized to increase and diffuse the knowledge of optics, pure and applied; to promote the common interests of investigators of optical problems, of designers, and of users of optical apparatus of all kinds; and to encourage cooperation among them. The purposes of the Society are scientific, technical, and educational.

The mission of OSA is to promote the generation, application and archiving of knowledge in optics and photonics and to disseminate this knowledge worldwide.

The Optical Society of America brings together optics and photonics scientists, engineers, educators, technicians, and business leaders. OSA's membership totals more than 14,000 individuals from over 70 countries. Approximately 32% of the Society's members reside outside the United States. Officers of the Society are elected by the membership.

OSA maintains a staff of just over 100, headquartered near Dupont Circle in Washington, DC. Led by Executive Director John Thorne, the staff supports the activities of the Society which include the publication of peer-reviewed journals and books, the sponsorship of scientific meetings and exhibits, public policy initiatives, and programs for student members, OSA Local Sections, and OSA Corporate Associates.

From: <http://www.osa.org/golocal/lsfind/>  
12/28/01

Rochester

Rochester Local Section of OSA  
est. 1916  
Paul Dewa  
60 O'Connor Rd.  
Fairport, NY 14450  
DewaPG@corning.com  
[www.osa.org/localsections/rosa/RochesterOSA.htm](http://www.osa.org/localsections/rosa/RochesterOSA.htm)

## **Laser and Electro-Optics Society, of the Institute of Electrical and Electronics Engineers (IEEE)**

From: <http://www.i-leos.org/info/mission.html>

**About LEOS**

Field of Interest

The Field of Interest of the Society shall be lasers, optical devices, optical fibers, and associated lightwave technology and their applications in systems and subsystems in which quantum electronic devices are key elements. The society is concerned with the research, development, design, manufacture, and applications of materials, devices and systems, and with the various scientific and technological activities which contribute to the useful expansion of the field of quantum electronics and applications.

The Society shall aid in promoting close cooperation with other IEEE societies and councils in the form of joint publications, sponsorships of meetings, and other forms of information exchange. Appropriate cooperative efforts will also be undertaken with non-IEEE societies.

Mission Statement

LEOS shall advance the interests of its members and the laser, optoelectronics, and photonics professional community by:

- providing opportunities for information exchange, continuing education, and professional growth;
- publishing journals, sponsoring conferences, and supporting local chapter and student activities;
- formally recognizing the professional contributions of members;
- representing the laser, optoelectronics, and photonics community and serving as its advocate within the IEEE, the broader scientific and technical community, and society at large.

From: <http://www.i-leos.org/info/alpha.html>

Mohawk Valley Chapter:

M.J. Hayduk  
Air Force Research Laboratory  
SNDR  
25 Electronic Parkway  
Rome, NY 13441-4514  
Tel: 315 330-7753  
Fax: 315 330-7901  
email: michael.hayduk@rl.af.mil

## Appendix E.

### Training.com Training Providers

From: <http://www.rnychamber.com/training/directory.htm>

#### **2logical**

Contact: Andrew Rickard  
30 North Union Street  
Rochester, NY 14607  
Phone: 262-6931  
Fax: 262-4106  
www.2logical.com  
Courses: Empowerment: Achievement Mapping, Self-Leadership: The Path to Professional and Personal Success, Strategic Selling.

#### **Applied Neurodynamics**

Contact: Dr. Walter F. Ferguson  
11 Fieldston Terrace  
Rochester, NY 14610  
Phone: 288-1853  
Courses: Advanced Sales Skills, Effective Presentations, Five Steps to Sales Success, Mindmapping - Applications in Business, Sales on the Line, Stress, Emotions and Your Health, Unleash Your Creativity.

#### **Career Vision Associates**

Contact: Janet Hadley  
55 Edenfield Rd  
Penfield, NY 14526  
Phone: 377-9080  
Fax: 377-9080  
Courses: Appraising Performance, Behavioral Interviewing, Coaching To Improve Employee Performance, Effective Delegation, Improving Customer Satisfaction, Leading And Developing Employees For High Performance: Leadership 1 Mini Series, Leading And Developing Employees For High Performance: Leadership 2 Mini Series, Leading Productive Meetings, Orientation For New Employees, Selecting Effective Training For Your Employees.

#### **Carosa, Stanton and DePaolo**

Contact: Chris Carosa  
2 Lantern Lane  
Honeoye Falls, NY 14472  
Phone: 624-1758  
Fax: 582-1856  
Email: Carosa, Stanton and DePaolo  
Courses: Appraising Your Lifetime Dream, How To Create A Low-Cost Publicity Campaign For Your Small Business, How To Easily And Quickly Bring More Customers To Your Small Business, How Small Business Owners Can Create A Profitable Strategic Plan That Really Works, Now

They Tell Me! How To Leverage Your Small Business Profits, Retirement Plans 1: Walking Past A Pot Of Gold, Retirement Plans 2: How To Avoid Losing That Pot Of Gold.

**Delta Stratagem**

Contact: Anthony Mangione  
Two Smethwick Court  
Pittsford, NY 14534  
Phone: 387-0999  
Fax: 387-0999

Courses: Lean Management Overview, Lean Manufacturing Techniques, Accelerated Lead/Cycle Time Reduction, Quick Set-Up And 5S Visual Management, Error/Mistake Proofing And Poka-Yoke, Metrics In A Lean Environment, Supervising In A Lean Environment, Teambuilding In The Lean Environment.

**Eagle International Institute**

Contact: Mia Palumbo  
1057 E. Henrietta Rd.  
Rochester, NY 14623  
Phone: 273-8000  
Fax: 273-8015  
[www.eagleplan.com](http://www.eagleplan.com)

Courses: How To Increase Your Personal And Professional Productivity, How To Improve Your Project Results, How To Set Professional Goals, P3: Personal Productivity For Palm Users.

**Element K Learning Center**

Contact: Walter Hyde  
140 Canal View Blvd.  
Rochester, NY 14623  
Phone: 240-7350  
Fax: 240-7780  
[www.elementklearningcenter.com](http://www.elementklearningcenter.com)

Courses: Access 97/2000 Level 1, Crystal Reports, DreamWeaver, Fireworks, FrontPage 2000 Introduction, HTML Level 1, Photoshop Introduction, SQL: Fundamentals Of Querying, Windows 98 Introduction, XML Introduction.

**Federal Contract Consultants**

Contact: Larry Christiansen  
15 Regency Drive  
East Rochester , NY 14445  
Phone: 381-5578  
Fax: 381-5578

Courses: Marketing Commercial Products to the Federal Government.

**The Leadership Factor**

Contact: Bill Self  
190 Linden Oaks Drive  
Rochester, NY 14625  
Phone: 389-0640  
Fax: 383-4209

Email: The Leadership Factor  
[www.leadershipfactor.com](http://www.leadershipfactor.com)

Courses: Customer Loyalty Measurement, Customer Satisfaction

Measurement And Improvement, Employee Surveys In The 21st Century.

**Mediation Center of Rochester**

Contact: Donna L. Huggins  
Suite 5-G, 2024 West Henrietta Rd.  
Rochester , NY 14623  
Phone: 272-1990  
Fax: 272-1978  
www.mediationctr.com  
Courses: Mediation Skills for Managing Workplace Conflict.

**Michael A. Knaus and Associates**

Contact: Michael A. Knaus  
180 Clovercrest Drive  
Rochester, NY 14618-3220  
Phone: 271-5127  
Fax: 271-0070  
Email: Michael A. Knaus & Associates  
www.maknaus.com  
Courses: Achievement Focused Supervisory Leadership Skills, The Dynamics Of Executive Leadership I, The Dynamics Of Executive Leadership II, Exceptional Middle Management Leadership Skills, How To Coach Your Staff To Achieve Optimal Work Performance Day In And Day Out, How To Successfully Lead Organizational Change, Business-Generating Telephone Skills.

**Nazareth College**

Contact: Pat Huntingon  
4245 East Ave.  
Rochester, NY 14618  
Phone: 389-2051  
Fax: 586-2452  
Courses: Supervising For Peak Performance, Basic German I For Beginners, Basic German II For Beginners, Beginning French Conversation I, Beginning Spanish Conversation For Travelers, Intermediate/Advanced Spanish, Introduction To Sign Language, Italiano Elementare II, Navigating The Internet.

**New Horizons Computer Learning Center**

Contact: Julie Stolt  
60 Corporate Woods Ste. 300  
Rochester, NY 14623  
Phone: 427-2200  
Fax: 427-2800  
www.nhrochester.com  
Courses: Access 97/2000/XP - Level 1, Excel 97/2000/XP - Level 1, Excel 97/2000/XP - Level 2, Frontpage 2000/XP - Level 1, Microsoft Project 2000 - Level 1, Outlook 2000 - Level 1, Powerpoint 97/2000/XP - Level 1, Windows 98/2000/ME - Level 1, Word 97/2000/XP - Level 1, Word 97/2000/XP - Level 2.

**Otto Associates**

Contact: Dale Otto  
55 St. Paul Street  
Rochester, NY 14604  
Phone: 263-3656



Fax: 263-3679

Courses: Leading Nonprofit And Community Organizations To New Levels Of Success, The Otto Leadership Model, Successful Communication Techniques For Leaders In The 21st Century.

**Pegasus Technical Training**

Contact: Claire Kenney

55 St. Paul Street

Rochester, NY 14604

Phone: 263-3656

Fax: 263-3679

Courses: Beginning Excel 97/2000, Introduction To Databases: Access, Introduction To Photoshop, Introduction To Power Point 97/2000, Introduction To The Internet, Using Excel List/Database Functionality To Solve Data Integration And Analysis Problems, Word Introduction.

**Priority Management**

Contact: Nancy McGahey

123 Bunker Hill Drive

Rochester, NY 14625

Phone: 383-1550

Fax: 385-1247

[www.prioritymanagement.com](http://www.prioritymanagement.com)

Courses: Priority Manager Program: Gaining Control and Balance, Working Sm@rt with Microsoft Outlook, Priority 365: Every Day Made More Effective.

**Reach and Achieve Associates**

Contact: Robin Wilson

26 Butternut Drive

Pittsford, NY 14534

Phone: 218-9350

Fax: 248-2117

[www.reachandachieve.com](http://www.reachandachieve.com)

Courses: Creating Innovative And Creative Teams, Improving Communication Through Positive Listening Approaches, Developing Internal Leaders And Coaches, Understanding And Adapting Our Behavioral Tendencies For Increased Effectiveness.

**Rewarding Solutions**

Contact: Betty Richardson

24 Bridgewood Drive

Fairport, NY 14450

Phone: 388-5108

Fax: 388-5108

Courses: Sales Incentive Plans: Tips On How To Design The Right Pay Plan For Your Sales Force, Fundamentals Of Compensation, Employee Recognition: Simple Tips That Really Work, Salary Surveys: How To Get The Most Value From Them, Designing Team And Individual Reward Programs, Finding And Keeping Key Talent.

**RGI International**

Contact: Lisa Moretto

92 Sunset Drive

Rochester, NY 14618

Phone: 461-3617

Fax: 461-3617  
Email: RGI International  
www.rgi-intl.com  
Courses: Get to the Point! Writing Effective Letters, Reports and Email,  
Writing Technical Reports and Correspondence, Writing Proposals That  
Win.

**Rochester Institute of Technology**

58 Lomb Memorial Dr., Bausch & Lomb Building  
Rochester, NY 14623  
Email: The John D. Hromi Center for Quality and Applied Statistics at RIT  
Credit Courses Through RIT  
www.rit.edu  
Courses: Data Analysis Using MINITAB, Design For Assembly (DFA),  
Developing ISO 9000/QS-9000 Documentation, Failure Mode And Effects  
Analysis (FMEA), Internal Auditing To ISO 9000, Interviewing Techniques,  
Management Process I, Psychology Of Stress And Adjustment, Reliability  
Through Maintenance, Small Business Marketing And Planning.

**UNISYS Corporation**

Contact: Linda Noeth  
1100 Corporate Dr  
Farmington, NY 14425  
Phone: 742-6860  
Fax: 742-4589  
www.unisys.com  
Courses: Fostering Teamwork Through Communication, Stress  
Management, Time Management, Business Writing Skills, Presentation  
Skills.

**Wegman's**

Contact: Carrie Smith  
1500 Brooks Avenue/PO Box 844  
Rochester, NY 14603-0844  
Phone: 239-2070  
Courses: Managing Work Relationships

**WorkSmart Learning Systems Inc.**

Contact: Debbie Harradine  
595 Blossom Road  
Rochester, NY 14610  
Phone: 654-7420  
Fax: 654-9973  
www.worksmartlearning.com  
Courses: Conducting 360-Degree Feedback Assessments, Conducting  
Employee Satisfaction Surveys And Other Organizational Assessments,  
The Enneagram Of Leadership: Find You Own Power, ROI (Return On  
Investment): The Holy Grail Of Training.

## Appendix F.

### IMC Training Seminars and Providers

From January-June 2002 Training Catalog, available at <http://www.theimc.com/>

#### Coaching

- Coaching

#### Communication

- Assertiveness
- Business Grammar Skills
- Business Writing
- Communication Power
- Conflict Management
- Dealing with Difficult Personalities
- Giving and Receiving Feedback
- Great Presentations
- Listening for Improved Communications
- Negotiations
- Telephone Techniques

#### Customer Service

- Customer Service and Relations

#### HSE Services

- Health, Safety, and Environment Services

#### Human Resources

- Advanced Employment Law
- Benefits Administration
- Compensation Concepts and Practices
- Employment Law
- Human Resource Management Certificate
- Human Resource Management Program
- Human Resource Overview
- Sexual Harassment

#### Interviewing

- Behavioral Interviewing

#### Leadership

- Budgeting for the Non-Financial Professional
- Finance for Non-Finance Professionals
- Leadership Basics
- Leadership, Parts One and Two
- Project Leadership

#### Manufacturing Excellence

- Cycle Time Reduction
- Total Productive Maintenance

#### Performance

- Creating a Positive Workplace
- Creative Problem Solving
- Motivating Today's Employees
- Performance Management

Draft of training resources piece  
12/18/01

Krys Cail

- Workforce Behaviors
- Project Management
  - Project Leadership
  - Elements of Project Management
- Sales
  - Lead Generation
  - Outside Sales
  - Telesales
- Stress Management
  - Beyond Stress
- Supervision
  - Gaining the Title, Earning Respect
  - Supervision
- Teams
  - Empowering Your Team
- Time Management
  - Managing Your Time and Priorities

## Appendix G Organizations in CareerBridge

The information in this appendix was obtained from....

**Rochester Resource Alliance, Inc.**

34 St. Paul St.  
Rochester, NY 14604

Matthew Hurlbutt, Executive Director, RochesterWorks!

Phone: (716) 258-3534

Fax: (716) 232-6033

Email: [mhurlbutt@RNYworks.com](mailto:mhurlbutt@RNYworks.com)

Rochester Resource Alliance, Inc. (RRA, Inc.), a 501(c)(3) not-for-profit corporation has been designated by the County of Monroe and the City of Rochester to administer the workforce development funds targeted for Monroe County. Established by the Greater Rochester Metro Chamber of Commerce and Industrial Management Council, RRA, Inc. serves as staff and fiscal agent to the Monroe County/Rochester Workforce Investment Board (WIB), managing all aspects of the local workforce investment system. RRA, Inc. manages over \$12 million in employment and training resources, designed to serve job seekers and businesses throughout Monroe County. As staff and fiscal agent for the WIB, RRA, Inc. administers resources allocated under the Workforce Investment Act, New York Works Block Grant, Welfare-to-Work Block Grant, InVEST Program and funds provided by the United Way of Greater Rochester. RRA, Inc. is located adjacent to the One Stop Career Center at 34 St. Paul Street, Rochester, New York 14614. The main phone number is 258-3530 and the fax is 232-6033.

**The RRA, Inc. Team**

Carol A. Cavanaugh.....	(716) 258-3537
Quality Improvement Manager	<a href="mailto:ccavanaugh@rnyworks.com">ccavanaugh@rnyworks.com</a>
Constance D. Felder.....	(716) 258-3538
Business Services Manager	<a href="mailto:cfelder@rnyworks.com">cfelder@rnyworks.com</a>
Matthew C. Hurlbutt.....	(716) 258-3534
Executive Director	<a href="mailto:mhurlbutt@rnyworks.com">mhurlbutt@rnyworks.com</a>
Patricia K. Pavelsky.....	(716) 258-3535
Special Project Manager	<a href="mailto:ppavelsky@rnyworks.com">ppavelsky@rnyworks.com</a>
Penny Singleton.....	(716) 258-3530
Special Project Assistant	<a href="mailto:psingleton@rnyworks.com">psingleton@rnyworks.com</a>
James Waters, Jr.....	(716) 258-3532
Youth System Manager	<a href="mailto:jwaters@rnyworks.com">jwaters@rnyworks.com</a>

Contact Name	Position	Organization	Street Address	City, State, Zip Code	Telephone Number
Jane Kriegler	?	Action for a Better Community	550 East Main Street	Rochester, New York 14604	325-5116
Harold Simmons Jr.	Program Director/Welfare-to-Work	Action for a Better Community	30 Hart Street	Rochester, New York 14605	325-1014
Stephen Laiosa	*	Career Systems Development Corp	1787 Norton Street	Rochester, New York 14609	544-4880
Vivian Cook-Johnson	*	BOCES @			429-7223 x 101
Virginia Rizzo	*	Center for Workforce Development BOCES 2	3589 Big Ridge Road	Spencerport, New York 14559	352-2764
Dorothy Siegel *	Program Manager/Community Employment	Catholic Family Center	25 Franklin Street, Sibley Tower Building 7th Floor	Rochester, New York 14604	262-7039 FX 262-7089
Kevin Zwiebel	Senior Employment/Training Coordinator	City of Rochester	City Hall Room 222-B, 30 Church Street	Rochester, New York 14614	428-6591
Paul Manning	*	Baden Street Settlement	152 Baden Street	Rochester, New York 14605	325-4910 x122
Kathleen Moyse	?	Work and Learn Center, Monroe Community College	1000 East Henrietta Road	Rochester, New York 14623	292-2442
Robyn Fitzgerald	?	Northwest Community Services	548 Lake Avenue	Rochester, New York 14613	254-8090
Barbara J. St. John	Coordinator/Family Investment Center	Rochester Housing Authority	86 Vienna Street	Rochester, New York 14605	697-1150
Deborah Burke *	Director, Counseling/Employment Services	Rochester Rehabilitation Center	46 Mt. Hope Avenue	Rochester, New York 14620	263-2690
Ian Andrew *	Manager, Welfare-to-Work	Rochester Rehabilitation Center	46 Mt. Hope Avenue	Rochester, New York 14620	263-2690
Hazelden Hercules	?	Urban League of Rochester	265 N Clinton Avenue	Rochester, New York 14605	325- 6530 x3094
Anthony Mentillo	?	Urban League/AmeriCorp	30 Hart Street	Rochester, New York 14605	546-7870
Paul Burke	?	Westside Adult Learning Center	420 Chili Avenue	Rochester, New York 14621	235-3990
Marcella Rawls *	Program Director	Threshold	80 St. Paul Street Suite 400	Rochester, New York 14604	454-7530 x221
Philip H.	Executive	Threshold	80 St. Paul Street	Rochester, New York	454-7530

Yawman *	Director		Suite 400	14604	
Melany Silas	Job developer *	Josh Lofton Alternative High School	?	?	234-3772

## Appendix H. Photonics, Optics and Imaging Cluster Firms

From <http://www.connectrochester.com/photonics.htm#>, 12/28/01

### Photonics

Burleigh Instruments, Inc.  
JML Optical  
Rochester Photonics Corporation  
Corning Photonic Technologies  
Applied Image Group  
Stefan Sydor Optics  
Melles Griot  
Tropel Corporation  
CVC, Inc  
Welch Allyn, Inc.  
PSC Inc.  
LaserMax Inc.  
Pixel Physics, Inc.  
Richardson Grating Laboratory  
Holotek  
ASE Optics  
Evaporated Metal Films Corp  
G-S Plastic Optics  
Navitar  
Optics Technology  
Optimax  
Opto-Alignment Technology  
Sine Patterns  
Upstate CTC  
Rochester Regional Photonics Cluster  
OpticsProfessionals  
aScribe, Inc.

### Imaging

Eastman Kodak Company  
The Document Company, Xerox  
Heidelberg Digital Imaging Association  
NexPress Solutions LLC  
PODi  
RIT Research Corporation  
Cohber Press

Monroe Litho  
Hammer Lithograph Corp.  
Flower City Printing  
Mercury Print Productions Inc.  
Canfield & Tack Inc.  
Tucker Printers  
Advanced Quickprinting Inc.  
Monarch, a division of Eltrex Industries Inc.  
Panther Graphics  
Express Press

## **Photonics Cluster, As Defined by Rochester Regional Photonics Cluster, Inc.**

From: <http://www.rrpc-ny.org/directory.asp>

RRPC Member listings are marked with a \*, PIANY Member listings are marked with a ^.

### Categories:

ACADEMIC INSTITUTION  
COMPONENT MANUFACTURER  
EQUIPMENT MANUFACTURER  
INSTRUMENT MANUFACTURER  
MANUFACTURER'S REPRESENTATIVE  
BUSINESS SERVICES  
OPTICAL SERVICES

### **Accuracy Microsensors, Inc.**

3800 Monroe Avenue  
Pittsford, New York 14534  
p: 716/381-1480  
f: 716/381-9801  
e: accuracymicrosensors@compuserve.com  
Cornelius McCarthy, President & CEO

INSTRUMENT MANUFACTURER

Designer and manufacturer of microsensors for measuring UV/Vis/NIR reflected or transmitted light. Provider of industrial and consumer instruments incorporating microsensors; systems for consumer color measuring applications and custom sensor configuration for industrial applications.

### **Advanced Glass Industries**

100 Boxart Street  
Pittsford, New York 14612  
p: 716/663-8700  
f: 716/663-1347  
Anthony Marino, CEO & President  
Henry G. Louis, Marketing & Sales Mgr.

COMPONENT MANUFACTURER

Manufacturer of molded and precision machined glass products. Service include precision custom molding, annealing, slumping, sawing, grinding, generating, edging, cutting and machining. Products include optical and filter glass, fused quartz, fused silica, industrial glass and exotic materials. Prototype to production quantities available.

### **Agilent Technologies\***

290 Woodcliff Drive  
Fairport, New York 14450  
p: 877/471-9086



f: 716/264-4150  
e: bob\_stolze@agilent.com  
Bob Stolze, Account Manager

COMPONENT MANUFACTURER

Manufacture of optical components and measurement instrumentation. Local activity is limited to sales and service.

**Amarel Precision Optics, Inc.**

78 Schuyler Baldwin Drive  
Fairport, New York 14450  
p: 716/223-2372  
f: 716/223-3413  
e: optemintl@aol.com  
Paul Nothnagle, Vice President, R&D

INSTRUMENT MANUFACTURER

Designer, developer and manufacturer of custom optical and illumination systems specializing in zoom technology. Supplier of engineering services for optical and mechanical applications.

**Applied Image Group\***

1653 East Main Street  
Rochester, New York 14609  
p: 716/482-0300  
f: 716/288-5989  
e: mail@appliedimage.com  
w: <http://www.appliedimage.com/>  
Bruno B. Glavich, President  
Robert Naum, Sales Manager

COMPONENT MANUFACTURER

Manufacturer of standard and custom imaged components, calibration standards, test targets, reticles, encoders, masks, bar-code standards, slits and gratings. Metrology calibration services available. Precision manufacturing and machining of optical balls, cylinders, planos, flats, mirrors and spheres. Supplier of image analysis hardware and software products, and coatings for optics and lighting.

**Applied Mechanical Technologies, Inc.\***

7931 Rae Blvd  
Victor, New York 14564  
p: 716.475.1680  
f: 716.475.1681  
e: steve@amteam.com  
Steven Beyer

**Ariel Optics\***

6935 N. Slocum Road  
Ontario, New York 14519  
p: 315.524.8211  
f: 315.524.9662  
Frederick Koch

**ASE Optics, Inc.\***

2 Stony Ridge Drive  
Honeoye Falls, New York 14472-9325  
p: 716/624-4233  
f: 716/624-8083  
e: chrisc@aseoptics.com  
Christopher Cotton, President

OPTICAL SERVICES

Provider of optical design and analysis services, specializing in laser-related systems and components.

**Axis Technologies, Inc.\***

6605 Pittsford-Palmyra Rd. - E7  
Fairport, New York 14450  
p: 716.223.4330  
f: 716.223.8433  
e: Dennis.wentworth@axis-technologies.com  
Dennis Wentworth

**Bridgekey Corporation\***

2000 Winton Road S #5-103  
Rochester, New York 14618  
p: 716/240-6012  
f: 716/240-6011  
e: fweiner@bridgekey.com  
Frank Weiner, President  
EQUIPMENT MANUFACTURER  
Designer of custom electronic systems for optics

**Brockport Machine\***

7976 Ridge Road  
Brockport, New York 14420  
p: 716/637-5330  
f: 716/637-8019  
e: brptmach@frontier.net  
Christopher T. Sturm  
BUSINESS SERVICES  
Machine Shop - Manufacturing

**Burleigh Instruments, Inc.\***

7647 Main Street Fishers  
Victor, New York 14564-8909  
p: 716/924-9355  
f: 716/924-9072  
e: info@burleigh.com  
w: <http://www.burleigh.com>  
David Farrell, President  
Melody Reynolds, Mgr., Marketing Services  
INSTRUMENT MANUFACTURER  
Manufacturer of Fabry-Perot interferometers and accessories, wavemeters for both CW and pulsed lasers, PZT-based actuators for submicron positioning, spectrum analyzers with computer-aided software.

**Chapman Instruments, Inc.**

175 Research Boulevard  
Rochester, New York 14623-3437  
p: 716/424-1380  
f: 716/424-2142  
Thomas Bristow, President  
INSTRUMENT MANUFACTURER  
Manufacturer of noncontact surface profilers for flat and curved surfaces with autofocus for long scans in two or three dimensions.

**City of Rochester - Economic Development Dept.\***

30 Church St., City Hall Room 005A

Rochester, New York 14614  
p: 716.428.7848  
f: 716.428.6042  
e: schofiel@ci.Rochester.lib.ny.us  
Thad Schofield

**Clover Capital Management\***

11 Tobey Village Office Park  
Pittsford, New York 14534  
p: 716.385.6090  
f: 716.385.9068  
e: mkaufler@clovercap.com  
Matthew Kaufler

**Cochran, Cochran & Yale, LLC\***

955 E. Henrietta Road  
Rochester, New York 14623  
p: 716/424-6060  
f: 716/424-6069  
e: gmb@ccy.com  
Gary M. Baker

BUSINESS SERVICES  
Professional, technical and executive search

**Crystal Digital Corporation\***

250 Mill St., Suite 44  
Rochester, New York 14614  
p: 716.777.4006  
f: 716.777.4118  
e: dweaver@crystal-digital.com  
David Weaver

**Dimension Technologies, Inc.**

315 Mount Read Boulevard  
Rochester, New York 14611  
p: 716/436-3530  
f: 716/436-3280  
e: dti@pppmail.nyser.net  
Jesse Eichenlaub

INSTRUMENT MANUFACTURER  
Manufacturer of stock and custom autostereoscopic three-dimensional video displays and two- and three-dimensional illuminators for LCDs that can be viewed without the use of special glasses or cumbersome viewing aids and can accept video and computer images.

**EMF Corp\***

239 Cherry St.  
Ithaca, New York Ithaca  
p: 607.272.3320  
f: 607.272.3369  
e: mdshay@aol.com  
w: <http://www.emf-corp.com/>  
Megan Shay

**ENI Technology, Inc.**

100 Highpower Road  
Rochester, New York 14623-3498

p: 716/292-7440  
f: 716/427-7839  
Ed Maier

INSTRUMENT MANUFACTURER

Manufacturer of RF and DC plasma generators for etch, CVD and high-power sputtering of semiconductors, hard disks, glass, optics and flat-panel displays.

**Eugene Stephens & Associates\***

56 Windsor Street  
Rochester, New York 14605  
p: (716) 232-7700  
f: (716) 232-7188  
e: srscott@rochester.rr.com  
Stephen R. Scott

BUSINESS SERVICES

Patent Attorney

**First Consulting, Inc.\***

P.O. Box 20710  
Rochester, New York 14602  
p: 716/388-9164  
f: 716/388-8211  
e: sholtz@firstconsult.com  
w: <http://www.firstconsult.com>  
Steve Holtz, Senior Consultant

BUSINESS SERVICES

First Consulting is a Rochester, N.Y. based firm that provides senior level expert consulting services for software engineering, application development, technical writing and business & information technology consulting.

**Fresnel Optics\***

1300 Mount Read Boulevard  
Rochester, New York 14606  
p: 716/647-1140  
f: 716/254-4940  
w: <http://www.fresneloptics.com>  
Bryan Parks, Rochester Site General Manager  
Donna Desmarais, Sales Manager

COMPONENT MANUFACTURER

Custom manufacturer of Fresnel lenses and other microstructured surfaces including linear, cylindrical, prismatic, aspheric, symmetrical and asymmetrical optical components replicated in a variety of polymers.

**Gage-Line Technology, Inc.**

121 LaGrange Avenue, Dept. 697  
Rochester, New York 14613-1577  
p: 716/458-2000  
f: 716/458-0524  
e: gage-line@rpa.net  
Frank Dombrowski, President

COMPONENT MANUFACTURER

Designer and manufacturer of reticles, imaged components, optical subassemblies, stage micrometers, optical inspection and calibration devices, custom gauging, comparator charts, test patterns, resolution targets, Ronchi rulings, linear scales and optical encoder disks.

**Glass Fab Inc.\***

PO Box 31880

Rochester, New York 14603  
p: 716.262.4000  
f: 716.454.4305  
e: glassfab@servtech.com  
Daniel Saltzman

**Great American Optics^**

104 Lincoln Parkway  
East Rochester, New York 14445  
p: 716/385-5530  
f: 716/385-4791  
Mike Ward

COMPONENT MANUFACTURER

Manufacturer of precision optical components including lenses, prisms, and glass and metal mirrors. Prototype and production volumes available.

**Greenwald & Basch LLP\***

349 West Commercial St., Suite 2490  
East Rochester, New York 14445-2403  
p: 716.387.0280  
f: 716.387.0288  
e: hgreenwald@greenwald-basch.com  
Howard Greenwald

**G-S Plastic Optics\*^**

PO Box 1091  
Rochester, New York 14603-1091

p: 716/232-1440  
f: 716/232-2314  
e: lensim@gsoptics.com

Leonard S. Simon, President

COMPONENT MANUFACTURER

Manufacturer of custom plastic optics including integrated optics, diffractive optics, hybrid optics, Fresnel lenses, plastic mirrors and narrow bandpass filters. Applications include sensing, scanning, detecting, electro-optics, optoelectronics and photo electronics.

**Hatch-Leonard-Naples Insurance\***

777 Canal View Blvd., Suite 100  
Rochester, New York 14623  
p: 716/546-3747  
f: 716/424-2798  
e: JAT@hlms.com  
w: www.hatchln.com  
Joseph Toulbot, Account Executive

BUSINESS SERVICES

Insurance

**John S. Herbrand, Esq.\***

P.O. Box 17727  
Rochester, New York 14617-0727  
p: 716/342-9929  
f: 716/342-4782  
e: herbrand@eznet.net  
John Herbrand

BUSINESS SERVICES

Attorney specializing in corporate and business matters, including start-ups, corporate governance, employee relations, IP and contract negotiation and interpretation.

B.S.M.E., Pennsylvania State University

J.D., George Washington University

**Holotek\***

205 Summit Point Drive  
Henrietta, New York 14467  
p: 716/321-6000  
f: 716/321-6001  
e: j\_hart@holotek.com  
w: <http://www.holotek.com>  
John Hart, General Manager  
Charles Kramer, Chief Technical Officer

EQUIPMENT MANUFACTURER

Manufactures OEM Optical Scanning Systems for the Pre Press Printing industry. Core capabilities include: Optical system design, holographic grating manufacturing, lens assembly and testing and laser system testing and qualification. Facility size of approximately 12,000 sq. ft. with 25 employees.

**Industrial Indexing Systems, Inc.**

626 Fishers Run  
Victor, New York 14564  
p: 716/924-9181  
f: 716/924-2169  
e: info@iis-servo.com  
Edward Steiner

EQUIPMENT MANUFACTURER

Manufacturer of motion control systems specializing in factory-floor systems for industrial applications. Designer of complete pre-engineered systems including controller, motor, drive, feedback devices, power supply, cables and NEMA enclosures in single- or multi-axis versions, programmed or user-programmable. Individual components also available.

**Institute of Optics, University of Rochester\***

121 Wilmot Building - RC  
Rochester, New York 14627  
p: 716.275.7708  
f: 716.244.4936  
e: teegard@optics.rochester.edu  
Prof. Ken Teegarden  
Prof. Wayne Knox

**Irondequoit Industries, Inc.**

277 Tumbleweed Drive  
Pittsford, New York 14534-2559  
p: 716/381-8440  
f: 716/381-8644  
Ted Hamm

MANUFACTURER'S REPRESENTATIVE

Supplier of electro-optical instrumentation and components.

**JML Optical**

690 Portland Avenue  
Rochester, New York 14621-5196  
Mike McCusker  
Joe Lobozzo

**LaserMax, Inc.\*^**

3495 Winton Place, Bldg. B  
Rochester, New York 14623-2807  
p: 716/272-5420  
f: 716/272-5427  
e: shw@lasermax-inc.com  
w: <http://www.lasermax-inc.com>  
Dr. Susan Houde-Walter, President  
Will Houde-Walter, CTO

LASER MANUFACTURER

Manufacturer of miniature visible and IR diode laser systems for OEM, industrial, medical, research and military applications including modulation, beam circularization and line generation; scientific-grade, MIL-SPEC and space-qualified systems. Supplier of custom package service.

**Lightwave Enterprises Inc.\***

789 Elmgrove Road, Suite 4400  
Rochester, New York 14624  
p: 716/426-0910  
f: 716/426-0955  
w: <http://www.lightwaveenterprises.com>  
Mike Nichols

COMPONENT MANUFACTURER

Designer and manufacturer of precision plastic optical components and assemblies, for both prototype and production requirements. Products include lenses, mirrors, beamsplitters, windows, prisms, cylinders and aspheres.

**Mason Selkowitz Marketing\***

6 North Main St., Suite 214  
Fairport, New York 14450  
p: 716.377.0440  
f: 716.377.1784  
e: [svacanti@masonselkowitz.com](mailto:svacanti@masonselkowitz.com)  
Steve Vacanti

**Monroe County Dept of Economic Development\***

50 W. Main St., Suite 8100  
Rochester, New York 14625  
p: 716.428.5345  
f: 716.428.5336  
e: [tbattley@growmonroe.com](mailto:tbattley@growmonroe.com)  
Thomas Battley

**Navitar, Inc.\***

200 Commerce Dr.  
Rochester, New York 14623  
p: 716-359-4000  
f: 716-359-4999  
e: [info@navitar.com](mailto:info@navitar.com)  
w: <http://www.navitar.com>  
Jeremy Goldstein, President

INSTRUMENT MANUFACTURER

Designer and manufacturer of video optical systems, optics for OEM applications, and custom optical products for industrial, medical, educational and governmental applications. Products include video microscopes, microscope objective coupling systems, microlenses, CCD and CCTV optics and fiber optic light sources.

**OPKOR, Inc.**

740 Driving Park Avenue  
Rochester, New York 14613  
p: 716/458-5390  
f: 716/458-9282  
e: opkor@frontiernet.net  
w: <http://www.ocli.com>  
Claude Tribastone, VP Engrg/Mktg  
William Beich, Business Dev. Director

COMPONENT MANUFACTURER

Designer and manufacturer of precision polymer optical components and assemblies. Providers of reflection and antireflection coatings for plastic and glass.

**Optics Technology, Inc.\***

3800 Monroe Avenue  
Pittsford, New York 14534  
p: 716/586-0950  
f: 716/248-2371  
Dominick Polizzi

INSTRUMENT MANUFACTURER

Designer and manufacturer of precision, close-tolerance, optical and mechanical components and assemblies. Specializes in miniature and subminiature parts and systems; capable of handling prototype through moderate quantity production.

**OpticsProfessionals\***

132 Allen's Creek Rd  
Rochester, New York 14618  
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e: rcorey@opticsprofessionals.com  
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Rick Corey

BUSINESS SERVICES

OpticsProfessionals is a recruitment firm specializing in the recruitment and career transition of people in the optics and photonics industries. We represent companies and people with common goals... the advancement and promotion of optics technologies and related industries. OpticsProfessionals is a division of Weterrings & Agnew, Inc.

**Optikwerk, Inc.**

PO Box 92607  
Rochester, New York 14692  
p: 716/321-1821  
f: 716/321-1809  
e: sales@optikwerk.com  
w: <http://www.optikwerk.com>  
Henry Gintner

SOFTWARE MANUFACTURER

Supplier of optics and laser CAD software for the layout, design and analysis of laser systems, illumination systems and conventional three-dimensional optical assemblies. Software includes an object-oriented drag-and-drop interface, on-line manufacturer's optical catalogs, and an extensive list of analytical and modeling capabilities.

**Optimax Systems, Inc.\***

6367 Dean Parkway  
Ontario, NY 14519-8939  
p: 716/265-1020



f: 716/265-1033  
e: sales@optimaxsi.com  
Rick Plympton, VP

COMPONENT MANUFACTURER

Manufacturer of optical components to customer-supplied specifications; confidentiality is standard practice. Specializing in spherical and aspheric optical components.

**Opto-Alignment Technology\***

95 Mt. Read Blvd  
Rochester, New York 14611  
p: 716.328.1890  
f: 716.328.1531  
w: <http://www.optoalignment.com>  
Sasha Pearlman

**Paris-Kirwan Associates, Inc.\***

1040 University Ave.  
Rochester, New York 14607  
p: 716.473.8000  
f: 716.473.2552  
e: steves@paris-kirwan.com  
Steve Smagala

**Pixel Physics**

125 Tech Park Dr.  
Rochester, New York 14623  
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e: kevin.kearney@pixelphysics.com  
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Kevin Kearney

**Planar Optics, Inc.\***

858 Hard Rd.  
Webster, New York 14580  
p: 716.671.0100  
f: 716.671.1303  
Horst Koch

**QED Technologies, LLC**

1080 University Avenue  
Rochester, New York 14607  
p: 716/256-6540  
e: dgolqed@frontiernet.net  
Donald Golini, President

EQUIPMENT MANUFACTURER

Designer and manufacturer of optical finishing equipment based on a precision polishing technology called magnetorheological finishing (MRF). Develops and markets complete integrated manufacturing systems; provides applications engineering and training services; develops manufacturing solutions; fabricates prototype lens elements.

**R. Kraft, Inc.\***

129 Shorecliff Drive  
Rochester, New York 14612-3925  
p: 716/621-6946  
f: 716/621-2778

e: clnrmsrvs@aol.com  
w: <http://www.cleanroomresources.com>  
Ralph Kraft, President

MANUFACTURER'S REPRESENTATIVE

Provider of in-house services including cleanroom troubleshooting and benchmarking; particulate analytical services; airflow visualization studies; third party certification of clean rooms, laminar and airflow devices; clean room cleaning; clean room construction management; training seminars & workshops; protocol development; and consulting. Manufacturers representative for clean room systems, equipment and supplies.

**Reflexite Precision Technology Center\***

200 Park Centre Drive  
West Henrietta, New York 14586  
e: [Steve.scott@Reflexite.com](mailto:Steve.scott@Reflexite.com)  
Steve Scott, Director

COMPONENT MANUFACTURER

Manufacturer of microstructured optical tooling. Processes include diamond machining, replication using nickel electroforming, and custom machining operations.

**Rochester General Hospital Laser Center\***

1425 Portland Avenue  
Rochester, New York 14621-3008  
p: 716/922-4505  
f: 716/544-8761  
Raymond J. Lanzafame, MD, MBA, Director  
p: 716/922-5617  
f: 716-544-8761  
Istvan Stader, PhD, Laser Surgical Research  
Scientist  
p: 716/922-3638  
f: 716/544-8761  
Karen Arcara, RN, Laser Nurse Specialist/Laser  
Safety Officer

ACADEMIC INSTITUTION

Established in 1981, The Laser Center at Rochester General Hospital is an internationally recognized, full-service Center with expertise in clinical applications, basic, preclinical and research and education regarding laser applications in health care. An experienced team of Board Certified physicians, nurses and technical staff supports the Center. Group members have trained thousands of professionals from around the world and have lectured and published extensively on laser applications and research. It directs all laser training for surgical residents from the University of Rochester School of Medicine and Dentistry and residents from the Hospital's obstetrics and gynecology program.

**Rochester Institute of Technology, Center for International Business and Growth\***

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David Reid

**Rochester MicroSystems, Inc.\***

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Mark Corio  
COMPONENT MANUFACTURER  
Electronics designer

**Sine Patterns**

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Al Bolognesi

**Spectra Services, Inc.\***

545 Basket Rd.  
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f: 716.265.4374  
w: <http://www.spectraservices.com>  
Mike Phillips

**Spectronic Instruments, Inc.**

820 Linden Avenue  
Rochester, New York 14625  
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f: 716/248-4014  
e: [info@spectronic.com](mailto:info@spectronic.com)  
w: <http://www.spectronic.com>  
Robert Behrends, President  
John DeLuca, VP, North American Sales

INSTRUMENT MANUFACTURER

Manufacturer of visible and UV-visible spectrophotometers, fluorescence instruments, color analysis instrumentation and cell disruption apparatus. Applications include industry, life science, education, food and beverage, water and wastewater, pharmaceuticals, petroleum and biomedical. North American sales representative for Unicam UV-visible spectrophotometers.

**Stefan Sydor Optics, Inc.\***

One Blossom Rd.  
Rochester, New York 14610  
p: 716.271.7300  
f: 716.271.7309  
w: <http://www.sydor.com>  
Jim Sydor

**Syntec Technologies, Inc.**

7100 Junction Road  
Pavilion, New York 14525  
p: 716-768-2513 x119  
f: 716-768-6099  
e: [LSteffenilla@syntectechnologies.com](mailto:LSteffenilla@syntectechnologies.com)  
w: <http://www.syntectechnologies.com>  
Lori Steffenilla, Operations Manager

COMPONENT MANUFACTURER

Manufacture of polymer optics - design, tooling, engineering, coating, & assembly

**Thermo RGL (Richardson Grating Laboratory)\*^**

705 St. Paul Street

Rochester, New York 14605  
p: 716/262-1331  
f: 716/454-1568  
e: gratings@gratinglab.com  
w: <http://www.gratinglab.com>  
Dr. Christopher Palmer, President

COMPONENT MANUFACTURER

Designer and manufacturer of a complete line of standard and custom diffraction gratings replicated from ruled and holographic masters. Reflection & transmission gratings, echelle gratings, plano & concave substrates, enhancement coatings, aberration-corrected gratings. Spectral range covered from the x-ray to the far IR. Design services available. OEM production capabilities.

**Total Business Solutions Group\***

9 Summit Oaks  
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Thomas J. Pearson, Partner

BUSINESS SERVICES

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**Tropel Corporation\***

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e: info@tropel.com  
w: <http://www.tropel.com>  
Dr. John Bruning, President  
Louie Denes, Sales & Marketing Mgr.

INSTRUMENT MANUFACTURER

Custom designer and manufacturer of high-performance optical assemblies for wafer, photomask and flat-panel lithography and inspection equipment suppliers. UV micro-objectives and applied to manufacture CDs, DVDs and integrated circuits. Capabilities include system modeling, thin-film coating and UV interferometry. Metrology instruments are laser-based grazing-incidence interferometers.

**Upstate CTC\***

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Rochester, New York 14625  
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**Vincent Associates\***

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e: info@winbiz.com  
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Anne Wells, Business Manager

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