



FELLOWS & YOUNG

INVESTIGATORS NEWSLETTER



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From the Editor's Desk

Welcome to the last issue of 2007 of the CCR-FYI Newsletter! In FYI news, preparations for the CCR-FYI Annual Postdoctoral Colloquium are in full swing. See program details in the announcements from the colloquium subcommittee chair. Included in this issue, are interviews from the 2007 outstanding postdoc awardee and the 2007 outstanding mentor awardee. Also, see the excellent article on using 3D Studio Max for effective scientific presentations. As always we welcome any contributions from you for our forthcoming issues.

*Arti N. Santhanam, Ph.D
Editor*

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IF YOU HAVE ANY COMMENTS, SUGGESTIONS OR WOULD LIKE TO CONTRIBUTE TO FUTURE NEWSLETTERS
PLEASE EMAIL US AT nciccrfyi@mail.nih.gov, or santhanama@ncifcrf.gov

Providing support for fellows at CCR

CCR-FYI Association is supported by the CCR Office of the Director

CCR-FYI News:

Dear Colleagues,

Mark your calendars and plan to attend!! The **8th Annual NCI-CCR Fellows and Young Investigator's Colloquium** often referred to as the postdoc retreat, will be held in Ocean City, MD from March 3rd-5th, 2008. A wide range of excellent keynote speakers have been confirmed, including:

- Dr. Carlo Croce (Ohio State University) – “MicroRNAs and Human Cancers”
- Dr. Stefanie Vogel (University of Maryland) – “Role of TLR4 in Disease”
- Dr. John Schiller (Laboratory of Cellular Oncology) – “HPV Vaccines and Other Interventions to Prevent Cervical Cancers” and,
- Dr. Patricia Steeg (Laboratory of Molecular Pharmacology) – “Molecular Regulation of Brain Metastasis of Breast Cancer”.

There are also several planned workshops throughout this meeting that provide valuable tips and insights throughout the various stages of a fellow's and young investigator's training program that can be used currently or into the future. These workshops include:

- Resume critique, interviewing and job negotiations
- Academia, Industry or Institute: Which one is for you?
- Grant Writing for young investigators and fellows
- International Career Opportunities
- Scientific management and,
- How to set up a new lab.

Changes have been incorporated for the career fair as we have expanded the career fair to a two day event. This move has successfully attracted a wide range of organizations from government, embassies and industry to attend. A current list of organizations attending will be posted on the Colloquium website. The career fair will be held from March 3rd to 4th and is structured to also include time for individual interviews with participating companies. We highly recommend all participants, especially senior postdocs, to impress

these companies by uploading your CV on the colloquium website and stopping by their tables to interact with them.

Amongst the talks and workshops, there will also be oral and poster presentations by your fellow peers. Remember, that it is strongly recommended that you submit an abstract in order to be eligible for one of several coveted \$1,000 travel awards, which will allow you to attend an extra scientific meeting. The deadline for abstract submission to win a travel award has passed, but you can still submit your abstract to present your research at the Colloquium. Point your browser to <https://cms.palladianpartners.com/cms/1187204210/> to obtain more information and to submit your abstract, CV and registration. Support for the colloquium is kindly provided by the CCR Office of the Director and covers all the registration, accommodation and meal costs throughout this meeting, which in essence translates to essentially a free meeting for all trainees.

The colloquium is an excellent chance to meet new people, network and hear about your peers' research in addition to the ground breaking science occurring at the forefront of cancer research. Although the colloquium is directly geared towards postdocs and young investigators, PIs, staff scientists and clinicians are more than welcome to attend. We also ask PIs to discuss and strongly encourage their postdocs in the lab to attend this beneficial meeting to enhance their trainee's collaborative and networking capabilities as well as allow them to explore their future career objectives.

Hope to see everyone there and don't forget to pack the swimwear and sunblock!!

Colloquium Subcommittee Co-chairs
Tim Chan, PhD
Jonathan Jacobs, PhD
Selinda Orr, PhD
Ram Savan, PhD

ARTICLES

Making Dynamic Presentations with Molecular Visualization and Animation Software

Introduction

With widespread availability of digital overhead projectors, and software packages that include slide presentation, photo editing, and drawing programs, the images in scientific presentations/publications are more professional and sophisticated than ever. However, many researchers remain unaware of the variety of options available for generating still images, or even animated sequences, of refined molecular structures. Among the most important utilities are the structural databases available on the Internet. The largest of these is the RCSB (Research Collaboratory for Structural Bioinformatics) Protein Data Bank, which contains over 40 thousand of files listing crystallographic and NMR structural coordinates, or coordinates derived from structural simulations, available for downloading in any of a number of standard file formats. Using free or commercial structure-viewing computer programs, these files can be utilized to depict the encoded molecular structure in three dimensions on a regular desktop computer. Virtually all features of the image can be changed or manipulated, including display style, color coding, scale, translational positioning or rotational positioning of either the entire structure or any sub-structure down to a single atom. In addition, a virtual molecular surface may be added to all or a portion of the structure in question. Images generated using molecular viewing and modeling software can be extremely useful in oral or poster presentations, as well as in publications, to convey structure-related concepts that translate only with difficulty in non-visual formats.

While powerful, modeling and molecular visualization programs have their limitations

Powerful modeling and molecular visualization software is empowered with simulation-oriented and other computational algorithms well suited for modulation of molecular shapes or images, but lacks support for non-structural image customization. Specifically, these programs generally do not provide advanced options for annotation, image refinement, introduction of non-structural images, or 3D animation. While it is possible to compose a limited animation sequence using shareware packages such as PyMol (DeLano Scientific LLC), doing so requires compo-

sition of a script. Written either in the Python scripting language or consisting of a sequence of PyMol commands, scripts are used to compile a series of pictures (a.k.a. "snapshots"), where each corresponds to a subtle, frame-by-frame change of the view and which are later assembled into a movie. Since the animation cannot be pre-viewed before final assembly, the outcome is not easy to predict. Furthermore, production of more complex animation sequences in this manner (for example, one involving multiple molecular interactions), would be quite difficult.

3D Studio Max circumvents these difficulties

Fortunately, the availability of 3D-animation software such as 3D Studio Max (Autodesk) allows users to precisely and easily merge molecular structures with other 2- or 3D objects into individual images that can later be compiled to create a movie. Ensemble images can be further refined by re-coloring, replacing object's texture, introduction of transparency, changing the finish (e.g., dull vs. glossy), and virtual lighting and camera manipulation are options that give the user ultimate control over the final production.



Visualization of HIV-1 reverse transcriptase in ribbon style obtained using Discovery Studio; based on 1HYS coordinates file.

3D Studio Max is ideal software for making 3D animations from models that were generated earlier using specialized software. One of the primary advantages of this package is the capacity for automatic interpolation; a function that guarantees smooth translation of any object from point A to point B. The end points are user-defined by drag-and-drop object manipulation in the context of a graphical user interface. Animation events, including transition, appearance, and disappearance of objects and colors, can also be sequenced relative to a user-defined time scale.

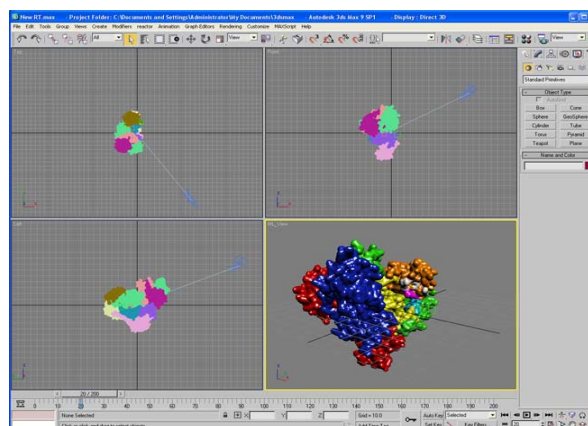
While integration of 3D structural models into sophisticated animation sequences offers great potential, the user must ensure that their molecular visualization software of choice supports export of 3D objects in a format recognized by 3D Studio Max. For example, 3D models generated in Discovery Studio (Accelrys) can be exported in VRML (Virtual Reality Modeling Language), a standard file format for representing 3-dimensional interactive vector graphics. VRML files, commonly called "worlds", are ASCII text files that contain coordinates and colors that define each object. They also include the viewpoint coordinates for the initial view of the 3D scene, and are named using the extension '.wrl'. Unfortunately, many freeware or shareware programs (such as PyMOL (1.0)) do not support WRL, so objects generated by these programs cannot be further utilized by 3D Studio Max.

Prior to generating a high-resolution production in 3D Studio Max, an animation can be previewed in a working window (viewport), and/or a preview file can be generated for subsequent viewing. This allows the user to evaluate and further refine their animation without investing the computation time and/or disk space required for rendering their final product. Ultimately, the animation is rendered and saved in either AVI or MOV file format, both of which are compatible with common video players, and can be inserted into slide presentations (e.g., MS Power Point), or attached to a publication as a supplementary file. Alternatively, the custom 3D scene can be saved as a WRL file and published on the Internet. This gives a user who is visiting the website a free hand for 3D navigation through the window in their browser, although this requires installation of a VRML plug-in such as Flux Player (available for free from Media Machines).

Conclusion

The Autodesk's website states that "Autodesk® 3ds Max® 9 3D animation, rendering, and modeling software lets game developers, design visualization professionals, and visual effects artists maximize their productivity and tackle challenging animation projects". We agree, and feel that the software is an excellent tool for researchers who deal with structural aspects of biomolecules and feel that state-of-the-art animated presentations would enhance their scientific presentations. It is also worth noting that 3D Studio Max can also be beneficial for generating animated presentations containing artists' renditions

of biological objects rather than complex structural images generated by molecular simulation. In other words, any biological event from an enzyme binding its substrate to an entire virus replication cycle can be successfully simulated with 3D Studio Max. Moreover, we strongly believe that the embedding of interactive models would significantly enrich on-line publications thereby increasing their impact, and expanding their readership in the future.



Movie production in 3D Studio Max; a screenshot of graphical user interface

Please look to the following links for more information on how to enhance your own scientific presentations.

Links

<http://www.rcsb.org/pdb/home/home.do> RCSB Protein Data Bank
<http://www.autodesk.com/3dsmax/> 3D Studio Max software developers
<http://pymol.sourceforge.net/> PyMOL software developers
<http://www.accelrys.com/products/dstudio/> Discovery Studio Software
<http://www.abcc.ncifcrf.gov/> Advanced Biomedical Computing Center – The National Cancer Institute's supercomputing facility
http://wwwtest.abcc.ncifcrf.gov/Discovery_Studio/ NCI licensed Discovery Studio (available for internal use only)
<http://cic.nist.gov/vrml/vbdetect.html> VRML plugins that are required for 3D navigation on WRL files published on the Internet.

Michal Legiewicz, PhD
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RT Biochemistry Section,
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Interview with 2007 CCR Outstanding Postdoctoral Fellow

Dr. Anuradha Budhu, a former post-doctoral fellow in the Laboratory of Human Carcinogenesis, was the recipient of the Outstanding Postdoctoral Fellow award at the 2007 CCR-FYI Retreat. In January of 2007, Dr. Budhu transitioned to a staff scientist in the same laboratory. Recently, she shared about her background and experience as a postdoctoral fellow through a Question and Answer session.

What is your scientific background?

"I started my scientific career as a student researcher in the Undergraduate Biology Research Program at the University of Arizona, studying gene expression patterns in the larval brain of *Drosophila melanogaster*. These studies were continued at The University of Adelaide in Australia through the UBRP Bravo! Program. After completion of my bachelor's degree from the University of Arizona, I joined the graduate program in Biochemistry/Molecular and Cellular Biology at Cornell University, where I studied retinoids and their effect on mammary carcinoma."

Why did you choose to work in the Liver Carcinogenesis Section of the Laboratory of Human Carcinogenesis for your post-doctoral training?

"I was very interested in learning about gene expression profiling after my graduate degree and that was an area of focus in the Liver Carcinogenesis Section. I also wanted to explore another area of cancer research after my graduate work

and this lab also afforded me the opportunity to work on cancer related research with potential clinical applications. In addition, I found it to be a highly collaborative environment with various areas of expertise."



Dr. Budhu (2nd from left) with her award at the CCR-FYI retreat

What has your research focus been since joining NCI?

"At NCI I have studied a significant problem associated with liver cancer therapy, namely the high frequency of intrahepatic metastasis or recurrence following surgical intervention. I have used microarray technology to search for diagnostic/prognostic biomarkers for hepatocellular carcinoma (HCC) at both gene and microRNA expression levels in the tumor or microenvironment of liver tissue that is associated with metastatic disease. I have also used similar approaches to study the underlying etiological factors associated with this disease and combined these microarray studies with functional assays to improve our understanding the mechanism of HCC metastasis."

Describe the benefits of your postdoctoral experience?

"During my postdoc here at NCI, I have had the opportunity to conduct cancer-related research that produced findings with potential clinical utility. I have been able to discuss my research, network and expand my scientific knowledge by interacting with several NIH collaborators and colleagues, both basic scientists and clinicians. I have also had numerous opportunities to present my research at scientific meetings in the US and abroad. "



Dr. Budhu gave the plenary talk at the 2007 CCR-FYI retreat

What advice can you offer current fellows?

“My advice to fellows would be to network, to think about the big and small picture with regard to your research and be interdisciplinary because looking in areas that are not your expertise can really enrich your studies, broaden your scope and help you grow as a successful scientist.”

What weighed into your decision to take your current position as a staff scientist at NCI?

“I have been able to pursue both basic and translational science at NCI and have had a very re-

warding experience in the Liver Carcinogenesis Section of the Laboratory of Human Carcinogenesis. The Staff Scientist position at NCI has provided me the opportunity to expand the research that I began as a postdoctoral fellow and to lead new efforts in the laboratory by managing/mentoring staff and coordinating scientific projects.”

Dr. Budhu was interviewed by CCR-FYI member Dr. Krista Zanetti

Letter from the Head of the Center of Excellence in HIV/AIDS And Cancer Virology, CCR

While we can be proud of contributions made by former and current NCI researchers in combating HIV infection, the sobering fact remains that the number of newly HIV-infected adults and children rose globally from ~3.9 million in 2004 to ~4.3 million in 2006, and the number of deaths from ~2.7 million to ~2.9 million over the same period. The initial successes of highly active anti-retroviral therapy (HAART) are also being threatened by the rapid emergence of drug-resistant virus, placing a constant demand for the continuous development of alternative and more effective therapeutic and immunological interventions. Recent evidence also suggests that the increased life expectancy of HIV-infected individuals on HAART may enhance their cumulative risk of developing both AIDS-defining and non-defining cancers (such as lung cancer, Hodgkin lymphoma, and anal carcinoma). In addition to the important role of these pathogens in the global HIV/AIDS epidemic, approximately one in every five human cancers is caused by infectious agents, with an estimate of 1.9 million cases per year worldwide. Of these, approximately 70% are caused by viruses such as human papilloma virus, type B and C hepatitis viruses, Epstein-Barr virus, and human T-cell leukemia virus.

As part of an NCI response to these formidable problems, the Center for Cancer Research has established the Center of Excellence in HIV/AIDS and Cancer Virology (CEHCV). As one of several new Centers, the CEHCV will coordinate existing structures and areas of expertise across the NCI-Frederick and Bethesda campuses as a means of rapidly communicating advances in the discovery, development and delivery of antiviral and immunologic approaches for prevention and treatment of HIV infection, AIDS-related malignan-

cies, and cancer-associated viral diseases.

The CEHCV will also be challenged to lead new initiatives, projects and collaborations, thereby positioning the IRP to play a significant role in interdisciplinary and multi-disciplinary translational research. A strong research program within the NCI should also seek to nurture partnerships and take advantage of complementary expertise of researchers across the NIH and within the extramural community. The CEHCV endorses NCI's longstanding commitment to making reagents and resources available, both nationally and internationally, as a means of diversifying the strategies that can be applied to these devastating diseases and of facilitating further efforts in this area.

Finally, continuing the outstanding quality of basic and clinical research within the NCI requires a commitment to mentoring junior colleagues at all levels. In my opinion, the strongest testament to our personal accomplishments as scientists is how well we have prepared the next generation for the challenges ahead. In the current, highly competitive funding environment, our involvement and support will be crucial to their success. Participation of CEHCV members in events planned for the coming years will be essential to such endeavors, and I am confident that we can rise to these challenges. Please visit CEHCV website <http://ccr.ncifcrf.gov/initiatives/CEHIV/>



Stuart F. J. Le Grice, Ph.D.
Head,
Center of Excellence in HIV/
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National Institutes of Health

Who Are the Outstanding Mentors?

On September 14, 2007 Dr. John Niederhuber announced the Outstanding Mentor and Mentors of Merit Awardees. The awardees have been chosen each year since 2001 through a competitive review conducted by a panel of post-doctoral fellows. The review focuses on seven separate criteria addressing the quality of the nominee's mentoring: mentoring record, professional expertise, accessibility, communication, training environment, provision of visibility for trainees, and commitment to trainee career development.

The 2007 Outstanding Mentor Awardees were Demetrius Albanes, M.D., Curtis C. Harris, M.D., and Sue Wickner, Ph.D. and the Mentors of Merit were Sanford M. Dawsey, M.D., Montserrat Garcia-Closas, M.D., M.P.H., Dr.P.H., Elise C. Kohn, M.D., Stuart F.J. Le Grice, Ph.D., Martha S. Linet, M.D., Douglas R. Lowy, M.D., John T. Schiller, Ph.D., and Jeffrey Strathern, Ph.D.

Dr. Curtis C. Harris, one of the Outstanding Mentor awardees, has been the Chief of the Laboratory of Human Carcinogenesis (LHC) since 1981 and during that time has mentored over 110 fellows, including his current fellows. His trainees who supported his nomination hail from all over the world, including the UK, Japan, China, Australia, France, Finland, Germany, England, Norway, Denmark, Ireland, Korea, Italy, Switzerland, Sweden, and the USA. In addition, his current and previous fellows nominated him without his knowledge making the award notification from Dr. Niederhuber a complete surprise. Once the announcement was made, Dr.



Harris was not only congratulated by his current fellows, but also received many congratulatory e-mails from previous fellows. It is clear that Dr. Harris has made a positive impact on the many young investigators who trained under him. When I was charged with writing this article, I decided to ask some of the current LHC fellows why they felt that Dr. Harris was an outstanding mentor. The answers I received collectively indicated that fel-

lows felt that Dr. Harris promotes a good balance between family and personal lives and career, making his approach to women scientists especially well received. Additionally, trainees indicated that Dr. Harris consistently has the best interest of his trainees in mind while successfully managing numerous different projects to advance the lab and each of its members. As one of his current fellows, I personally appreciate that Dr. Harris provides adequate training opportunities, mentors fellows on how to develop and maintain successful collaborations, and reinforces behaviors that lead to independence. He also encourages trainees to develop new research projects and ideas, write grants if desired, and participate in professional activities outside of the laboratory, all of which are critical for successful career development.

In addition to being a remarkable scientific mentor, Dr. Harris is a strong role model for early-career scientists. Not only has he created a unique environment for high quality, multidisciplinary scientific research, he holds many responsibilities outside of the laboratory including a Clinical Professor of Medicine and Oncology at Georgetown University School of Medicine, Editor-in-Chief of Carcinogenesis, Associate Editor of Cancer Research, and actively participates on a multitude of organizing committees for scientific conferences.

When Dr. Harris was asked what he sees as the most important aspects to successfully mentoring fellows, he indicated that it's critical to share a level of mutual respect with fellows to foster their growth, as well as try to maintain their childhood curiosity and enthusiasm while developing their adult analytical skills and prepare their path to independence. The most enjoyable part of mentoring for Dr. Harris is "witnessing the joy of discovery in our fellows and watching their careers develop once they leave the lab."

Many of the fellows who have trained under Dr. Harris in LHC have an impressive record of achievement. He feels that searching out individuals who are self-motivated from the start is one of the most important aspects to hiring men and women who will excel both scientifically and professionally. Dr. Harris is always looking for new postdoctoral fellows with a clear record of

accomplishment to join his lab. Each time he attends a scientific conference, he searches for three important things; a new idea, a new collaboration, and a new postdoc. If he leaves the meeting with all three, he considers the meeting a success.

It is a challenge to outline the multitude of characteristics that exemplify why Dr. Harris has been an outstanding mentor to the fellows who have trained with him over the last 26 years. The fact that Dr. Harris was nominated for and received the 2007 Outstanding Mentor award dem-

onstrates that his current and previous fellows clearly appreciate all of these characteristics that have helped them achieve tremendous success while in his lab.

Dr. Harris is one of many outstanding mentors at NCI. Dr. Sue Wickner, also a 2007 Outstanding Mentor awardee, will be highlighted in the next issue of the CCR-FYI Newsletter.

Dr. Harris was interviewed by CCR-FYI member Dr. Krista Zanetti

Retrospective on CCR Postdoc Training– results of the 2007 survey

While we eagerly anticipate the 2008 colloquium, we are excited to report on the previous FYI-CCR annual retreat that took place February 27 – March 1, 2007, in Ocean City, MD. Amongst the many different activities at the colloquium, a survey was conducted to analyze the status and perspectives of the CCR postdoctoral and post-baccalaureate community. In this article we briefly share an overview of their thoughts and concerns.

This year, 297 attendees were present at the retreat, and 216 completed the survey. Of these respondents, 63% identified themselves as non-U.S. citizens working for the NCI, and half of

them are Visiting Fellows (Figure 1). Internet and web-based tools are the most common sources used to find a position, highlighting the importance of new technologies helping NCI trainees in this matter.

Total Respondents	216	Percent of Retreat Attendees	72.7%
Number of Retreat Attendees	297	Percent of NCI Trainees	21.23%

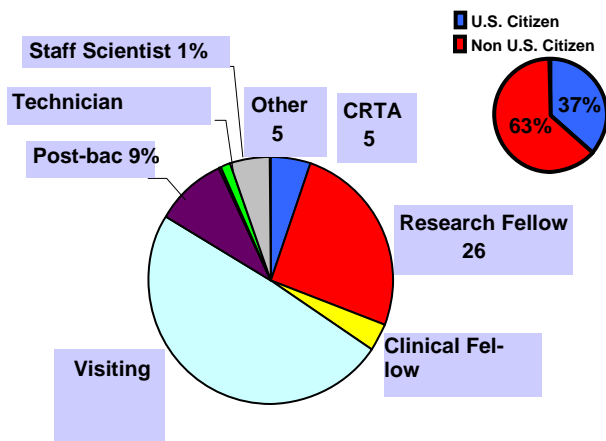
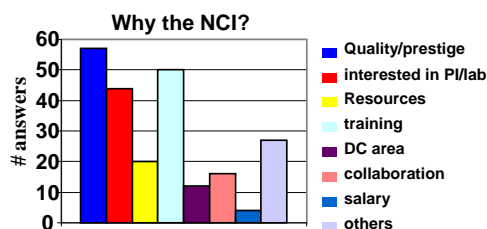


Fig1. Survey Respondents



Strong points of the NCI

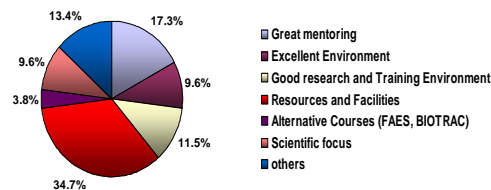


Fig. 2: Quality of NCI as a Training Environment

Most of the people (65.7%) were attracted to the NCI because of the resources, scientific quality, and the lab they were going to work in (Figure 2, upper panel). Although attendees scored interactions with their PI pretty high in general, with strong mentoring (Figure 2, bottom panel), solid preparation for their next career and overall guidance in improving their training (data not shown) there were a fair amount of people (21%) that felt they were not being adequately prepared for their future career (Figure3).

This number is higher compared to last

year's result, in which only around 3.7% shared that feeling. Several suggestions for improving postdoctoral training at the NCI were raised by around 37% of all respondents, and included more career options, better PI-PD interactions, flexibility in PI assignment, etc (Figure 3).

PD are being prepared for an independent career or further graduate education

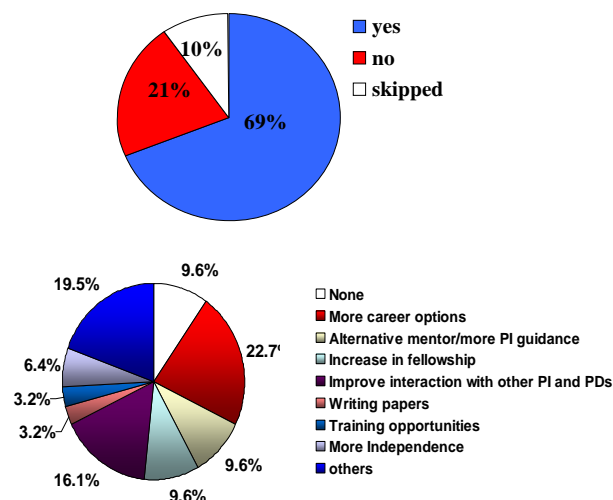


Figure 3: Career Development

Although we know that these data may not reflect precisely the opinion of the entire NCI fellow community, we have tried to give an accurate overview of the data analyzed, and hope this survey will provide insight into identifying problem areas in training and possible solutions towards addressing these issues.

We want to thank all of the people that made this study possible. We also want to emphasize how important obtaining continuous feedback from the CCR fellows through tools like the CCR-FYI retreat survey is critical toward continuing the dialogue between the fellows and the Office of Training and Education towards improving the training experience at the CCR. Remember, we need your help in order to do this! Do not forget to fill out next year's survey at the 8th annual retreat, scheduled for March 3-5, 2008, in Ocean City, MD!

Gonzalo De La Rosa, PhD
 Christian Capitini, MD
 FYI-CCR Scientific Sub-committee

Sudoku Corner

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