Research Proposal Submitted to the National Science Foundation

Proposed Amount 113,544 Propose	d Effective Date 6/1/76	Proposed Duration 24 (months)								
Title MOLGEN: A Computer Scien	ce Application to Molecular									
Principal InvestigatorSoc. Sec. No	Tratitution St	anford University								
		Department Computer Science								
Institution (if different from submitting ins	titution) Branch/Campus_	- Branch/Campus Main								
Address	AddressSt	anford, California 94305								
Branch/Campus		-								
Co-Principal Investigator Edward	A. Feigenbaum Soc. Sec.	No.								
Co-Principal Investigator Joshua L	ederberg Soc. Sec.	No.								
If renewal request previous NSF gra	ant No									
Make grant to Stanford Universi										
(name of institution	or organization to which g	rant should be made)								
Endorsements:										
Principal Investigator(s)	Dept. Head	Institutional Admin. Official								
Name Edward A. Feigenbaum	Robert Floyd	D'Ann Downey								
Signature Elwood A. Flighton	Robert Flord									
Title Professor of	Chairman, Department	Asst. Sponsored								
Computer Science	of Computer Science	Projects Officer								
Telephone Number										
(415)497-4878	(415)497-2274	(415)497-2883								
Date										

Research Proposal Submitted to the National Science Foundation

Proposed Amount 113,544 Proposed	Effective Date 6/1/76	Proposed Duration 24 (months)
Title MOLGEN: A Computer Science	Application to Molecular	Genetics
Principal Investigator	Institution	Stanford University
		Computer Science
Institution (if different from submitting insti		
Address	Address	Stanford, California 94305
Branch/Campus		
Co-Principal Investigator Edward A.	Feigenbaum Soc. Sec	e. No.
Co-Principal Investigator Joshua Lec	derberg Soc. Sec	. No.
If renewal request previous NSF gran		
Make grant to Stanford University		
(name of institution of	or organization to which	grant should be made)
Endorsements:		
Principal Investigator(s)	Dept. Head	Institutional Admin. Officia
Name Joshua Lederberg	Joshua Lederberg	D'Ann Downey
Signature	elety!	
Title Professor & Chairman	Profes & Chairman	Asst. Sponsored
Department of Genetics	Department of Genetics	Projects Officer
Telephone Number		
(415)497-5801	(415)497-5801	(415) 497-2883
Date		

1 PROLOGUE

The scientific text of this proposal is identical with that of companion from the University of New Mexico. The budget is it will be administered by Stanford University separate and We realize that this is an unusual indicated in the budget page. procedure but we feel it is justified as a means of bringing geographically separate scientists together to work on common problems. The personnel involved in the proposals began working together on the organization of the project in June, 1975 when Prof. Martin visited Stanford for the summer. We are proposing that Martin spend the major part of the first year at Stanford, working closely with the Stanford group on all phases of the foundation of the system. This is strongly supported by Prof. D. Morrison, chairman of the Division of Computing and Information Science at UNM. The second year Martin will return to UNM to continue working on special subparts of the system with the aid of a UNM graduate research assistant. Constant communication can be maintained through the excellent SUMEX-AIM time sharing installation as outlined in the Resource Section of this proposal. At regular intervals all participants in the project will meet at Stanford to review progress and suggest new directions.

Table of Contents

Section	Page
Subsection	

1.	Intro	duction		•	•	•	•	•	•	•	•	•	•	•	•	•	1
2.	Backg	round and	Related	Wo	rk	•	•	•	•	•	•	•	•	•	•	•	7
	2.1		nship to ligence	0 t	her •	Re:	sea:	rch •	in •	Ar •	tif •	ici •	a 1 •		•		7
	2.2		Work in emistry	Co •	mpu •	ter:	s A	pp1:	ied •	to	Ge •	net	ic •	•	•	•	16
	2.3		ing Rese amming P				ne :	Sta:	nfo	rd 1	Heu •	ris •	tic •	•	•	•	18
3 3 3	Detai	led Plans	for Wor	k D	uri	ng :	the	Pr	opo	sal	Рe	rio	d		•	•	2 3
	3.1	Introdu	ction	•	•	•		•	•	•	•	•	•	•	٠	•	23
	3.2	An Expe	rimental	P 1	ann	ing	Pr	ogr	am	•	•	•	•	•	•	•	26
	3.3	An Enzy	me Simul	ati	on :	Pro	gran	m	•	•	•	•	•		•	•	3 1
	3.4	Knowled	ge Base	•		•	•	•	•	•	•	•	•	•	•	•	35
	3.5	A DNA s	tructure	e n	try	an	d e	dit	ing	s y	ste	ជា	•	•	•	•	39
4.	Resou	rces		•	•	•	•	•	•	•	•	•	•	•	•	•	4 1
5.	Bibli	ography		•	•	•	•	•	•	٠	•	•	•	•	•	•	43
6.	Perso	nnel		•	•	•	•	•	•	•	•	•	•	•	•	•	47
7.	Budge	t		•	•				•	•	•	•		•	•	•	48