How to choose an NSF Center?

(Location)

75 Miles

- We are all within 1.5 hour commute from each other.
- All are within 1.5 hour commute from National Labs .
- Easy access to public transportaion.

(These factors are more important to students)…

Science-

- How many IRG's
- Overiding theme for each
- What is common to each and what is different?
- Organizational Meeting

- $$
- Director-how will it be administered?
- Identify major players
- Identify directions
- Request white paper

  - Identify common education and outreach components.
  - Decide who does the writing!!

IRG on CMOL Nanoelectronics

(preliminary list of participants, collaborators, and research topics)

A. Main Research Thrusts

1. Design, synthesis, assembly, and testing of single-molecular electronic devices for hybrid "CMOL" (CMOS/MOLecular) circuits.
2. Development of architectures for CMOL circuits, including defect-tolerant microprocessors and biologically-inspired neuromorphic circuits.

B. SBU Faculty Participants

1. Paul Adams (Neurobiology and Behavior) – biological insights for neuromorphic architectures
2. Adrian Leuciuc (Electrical Engineering) – CMOS prototyping of neuromorphic networks
3. Konstantin Likharev (Physics and Astronomy) – P.I.; molecular device assembly and testing
4. Jim Lukens (Physics and Astronomy) – nanostructures for molecular self-assembly
5. Andreas Mayr (Chemistry) – molecular device synthesis
6. Andrea Pacelli (Electrical Engineering) – molecular transport modeling

C. External Collaboration

1. Brookhaven National Laboratory (J. Miller) – electron transfer in molecules
2. Hewlett Packard Laboratories (A. Bratkovsky) – molecular device theory
3. Lucent Bell Labs (Z. Bao, N. Zhitenev) – molecular transport experiment
4. New Jersey Institute of Technology (S. Savrasov) – electron transport theory
5. Oak Ridge National Laboratory (J. Barhen, V. Protopopescu) - neuromorphic architectures

External Advisory Committee:
Prof. Michael Jaffee NJIT
Dr. Jack F. Douglas NIST
Dr. Larry F. Charbonneau, DuPont

Garcia MRSEC
Polymers at Engineered Interfaces

Director: Miriam Rafailovich,
Administrator: Nancy Rifkind
Laboratory Technician: Lourdes Collazo

Faculty	Graduate Students	Research Scientists	REU (School)
SUNY Stony Brook			
Benjamin Chu **(Chem.)**	Xiaohua Fang	Shouren Ge	M. Bronner (Yale)
Benjamin Hsaio **(Chem.)**	John Jerome	Nadine Pernodet	Robert Samstein (Yale)
Dilip Gersappe **(Mat Sci)**	E Guan	Tadanori Koga	Shira Billet (Princeton)
Perena Gouma **(Mat Sci)**	Yuan Ji	Vladimir Samiulov	Vinitha Jacobs (Princeton)
Jonathan Sokolov **(Mat Sci)**	Binquan Li	Young-Soo Seo	Kelly Gloor (Dartmouth)
Miriam Rafailovich **(Mat Sci)**	Song-Feng Li	H. Luo	S. Kaszuba (U of Virginia)
Richard Clark **(Dermatology and BME)**	Radha Ramasamy		Tova Sokolov (Pratt)
George Stell **(Chem)**	Mayu Si		Aprajita Matoo (Columbia)
Henry White **(Mat Sci)	Chunhua Li		Joshua Levine (Columbia)
	Yuan Sun		Abigail Maller (Columbia)
	Yiantian Wang		Rebecca Klein (Columbia)
	Harry Xavier		Varun Mehta (Columbia)
	Quan Wan		Edmund Palermo (Cornell)
	E. Jaber		Michael Snow (Cornell)
	Isabelle Afriat		Tedi Setton (Swarthmore)
	*Donnie Isseroff (Sachler Medical School)		Arielle Galambos (Swarthmore)
			Robert Fisher (Brandeis)
			Amruta Desai (SUNY Albany)
	Eli Hoory		Rikki Frenkel (Queens)
	Kaustab Ghosh		Lenny Slutsky (Duke)
	Shazia Rhana		Dmitri Serebrianik (SUSB)
			Sravanesh Muraldihar (SUSB)

CUNY: College of Staten Island and Queens College : Steve Schwarz, Co-director

Nanlo Yang **(Chem)**	Jun Li	Dayi Cui	Siddharth K. Dave (Queens)
C. Y. Shew **(Chem)**	Chong Cheng	Min-Hui Cui	
Y. Schnidman **(Phys))**	V. Shapovalov	Vladimir Zaitsev	
Steve Schwarz **(Phys)**			

Polytechnic University : Avi Ulman , Co-director

	Maja Mihajlovic	Muhammed Shafi	Robert DeLuca (Polytechnic)
Avi Ulman **(ChE)**	Alex. Korniakov	Katja Loos	
	James Lai	Ansil Dyal	
	SeungWook Chang		

* New members ** Left the MRSEC 2002-03

North Carolina State

Harald Ade **(Phys)** David Kilcoyne

National Laboratory

Sushil Satija	NIST
Devinder Mahajan	Brookhaven National Laboratory/USB
Sunil K. Sinha	Los Alamos National Laboratory/UCSD
Lawrence Lurio	Univ. of Northern Ill/ Argonne National Lab

Industrial Partners:

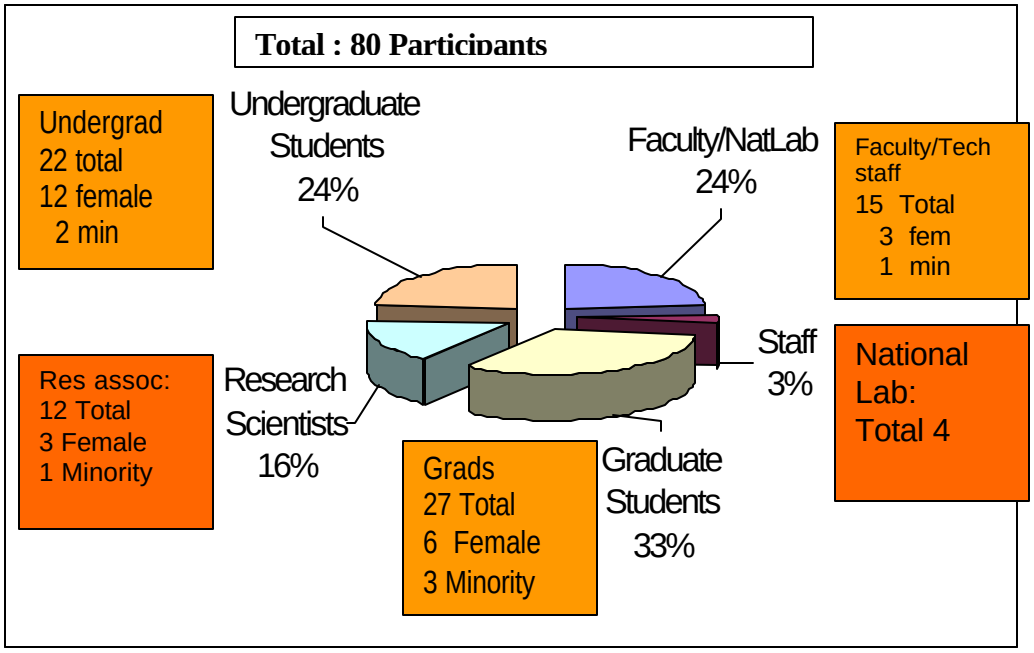
Dennis Peiffer	EXXON/Mobil
Daniel Slep	Hilord Chemical
Glen Ko	RES Group
Karl Heinz Stroble	EELE Laboratories
Isaac Cohen	Estee Lauder
David Abecassus	Polymer Solutions
Tohei Moritani	Coram International
Arnold Lustiger	EXXON/Mobil
A.J. Dias	EXXON/Mobil Chemical
Etushi Akashige	Mitsubishi Chemical

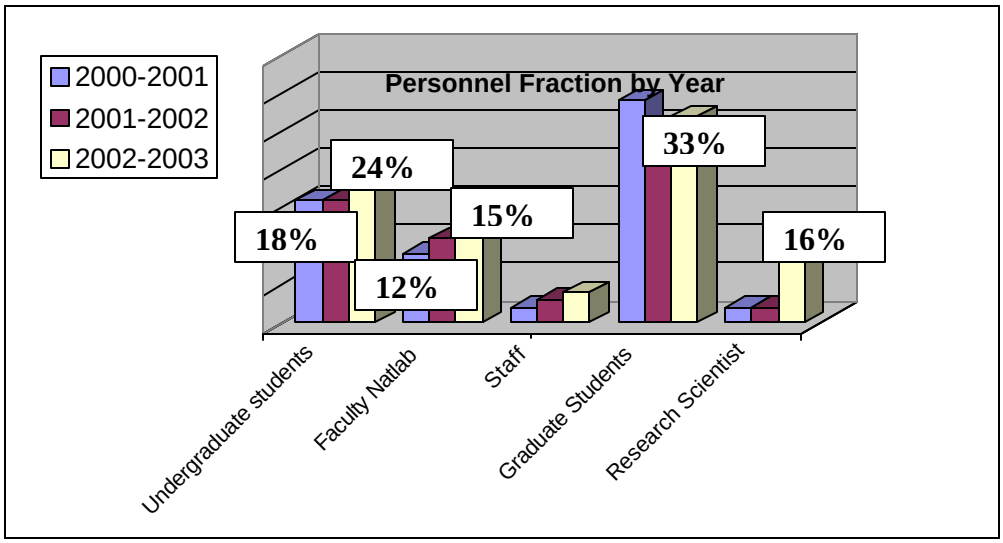
Foreign Collaborators:

Adi Eisenberg (Chem)	McGill, Canada
Nisim Garti (Applied Chem)	Hebrew Univ, Israel
Armin Gölzhäuser (Physics)	Univ. Heidelberg, Germany
Michael Grunze (Chem)	Univ. Heidelberg, Germany
Michael Himmelhaus (Chem)	Univ. Heidelberg, Germany
Rainer Jordan (Chem)	TU Munich, Germany
Mahn-Wan Kim (Biophys)	KAIST, Korea
Wolfgang Knoll (Biophys)	MPI Mainz, Germany
Gad Maron (Phys Chem)	Hebrew Univ, Israel
Oskar Nuyken (Chem)	TU Munich, Germany
Pascal Silberzan (Phys)	CNRS, France
Gary Slater (Phys)	Univ. Ottawa, Toronto
Reshef Tenne (Materials Eng)	Weizmann Inst., Israel
Bernard Tinland (Bio Phys)	CNRS, France
Metin Tolan (Scattering Phys)	Dortmund Univ, Germany
Serge Viminot (Bio Phys)	CNRS, France
Kwan Woo Shin (Phys/Chem)	KJIST, Korea
Moshe Deutch (Phys)	Bar Ilan, Israel
Bruce Lennox (Chem)	McGill, Canada

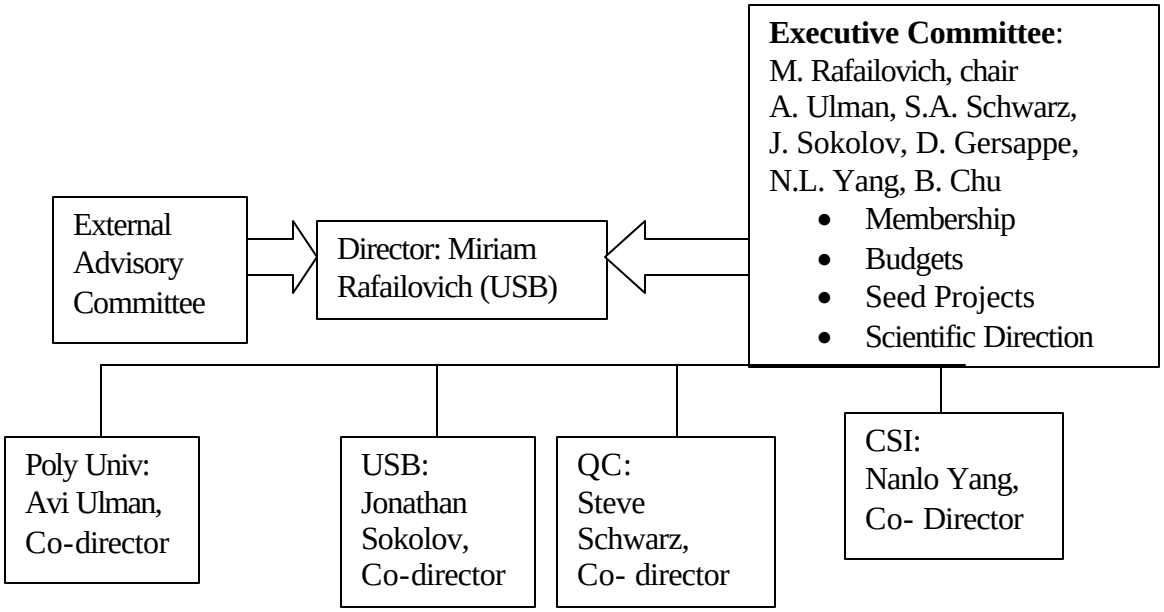
Total: 80 US participants as of 9/03
19 Foreign Collaborators from 5 Countries;

4 new faculty members voted in, one left the MRSEC
5 new industrial partners
1 (ANL) to complete national lab affiliations!





Administration:



Committees:

Education	**Industrial Outreach**	**International**
Steve Schwarz, Chair	N.L. Yang, Chair	A. Ulman, Chair
M. Rafailovich	D. Gersappe	N. Pernodet
J. Sokolov	D. Peiffer	B. Chu

Highlights (since 2000) :

20 PhD Graduates; 7 University; 8 National Labs; 5 Industry

Bruce Fu	2002	Michigan State	Sarika Sharma	2002	Kansas State
Wenhua Zhang	2002	NIST	Xuesong Hu	2002	ANL
Tina brower	2002	Naval Research Lab	Yuxie Pu,	2001	Genetex
Kwanwoo Shin	2001	NIST	Andrew Winesett	2001	Exxon/Mobil
Wentao Li	2001	RES Group	Channel Yi	2001	Los Alamos
Yimin Zhang	2001	National Starch	GunYoung Choi	2001	U of New Mexico
Yuri Strezhemechny	2000	New Mexico	Jung Fong Kang	2000	Clemson University
Young Seo Soo	2003	NIST	Xuesonh Hu	2003	ANL
Haobin Liu	2003	Northwestern	Maja Mihailovic	2003	CSI
Shaoming Zhu	2001	Genetex	Olivier Dhez	2003	ESRL

Publications in Refereed Journals (9/00-2/03):

110 Accepted and >20 Submitted (12 co-authored by HS/RET/REU)

Patents: 4 (3 with HS students) and Disclosures: 5
Five with HS students, Six with grad students, One RET

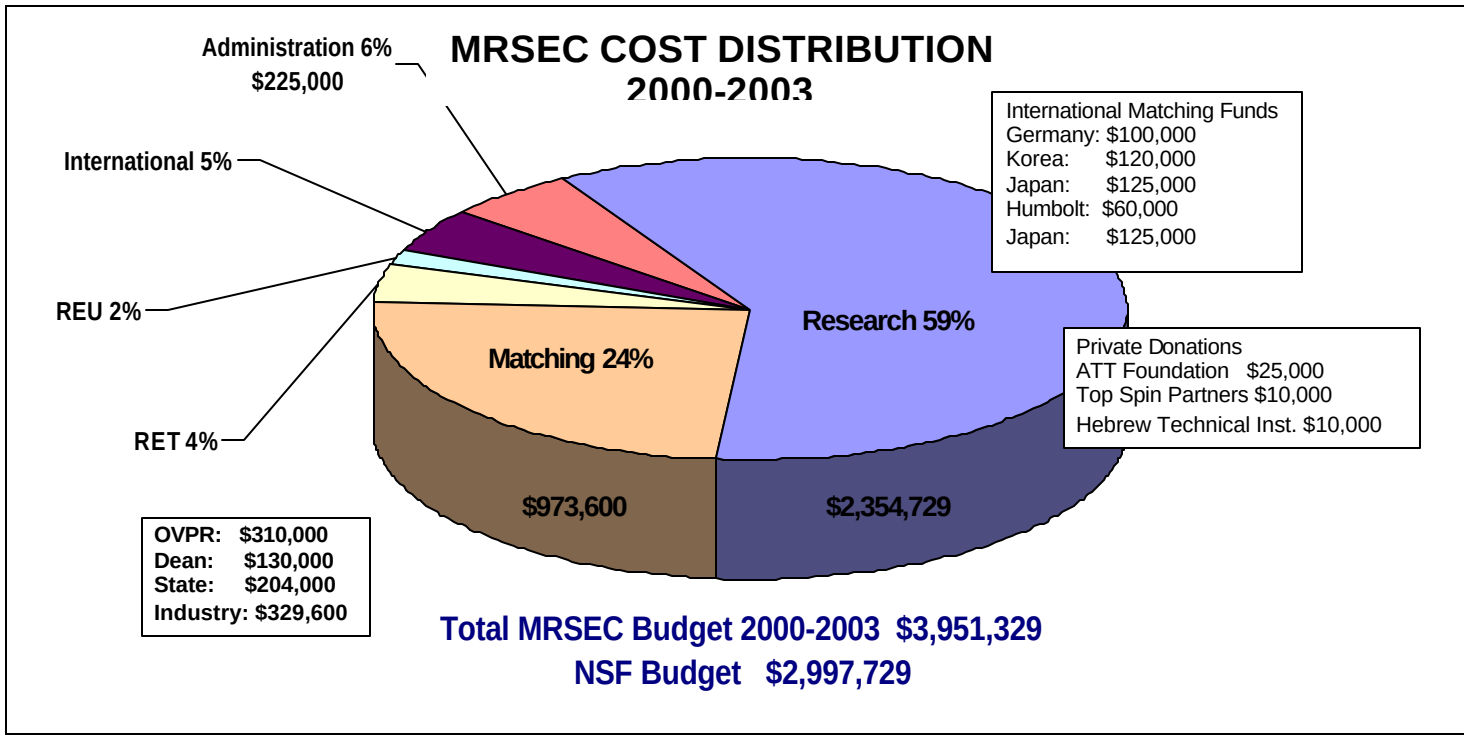
1. R-7261 **Magnetoresistive Device Using Patterned Magnetic Nanostructures**
   R. Gambino, JH. Londono, M. Rafailovich, J. Sokolov, S. Zhu
2. R-7364 **An Inexpensive, Versatile and Efficient Compatibilizer for Highly Immiscible Polymer Blend Films**,
   G. Cheung, M.H. Rafailovich, J. Sokolov, B. Chu, B. Hsaio, X. Zhu
3. R-7426 **Means for Regulating Protein Adsorbtion onto Substrates**
   K. McLeod, N. Pernodet,M.H. Rafailovich
4. R-7533 **Flame Retardant and UV Absorptive PMMA Nanocomposites**
   M. Si, M. Goldman, M.H. Rafailovich
5. R-7546 **Controlling Polymer Adhesion Using Filler Particles**
   M. Bronner, M.H. Rafailovich
6. R-7581 **Viscometry of Thin Films**
   S. Billet, D. Sosnowik, MH Rafailovich, S. Sharma
7. R-7601 **High Performance Elastomer Materials**
   R. Occhiogrosso, E. Palermo, M. Si, M.H. Rafailovich
8. R-7665 **Low Density, Low Dielectric Constant, Metalizable Polymer Film**
   Tadanori Koga, M. Rafailovich, Y. Ji . H. Choi, A. Long
9. R-7629 **Flame-Retardant Elevacite Acrylic Resin Nanocomposites**
   J. Hefter, M. Si, M. Rafailovich

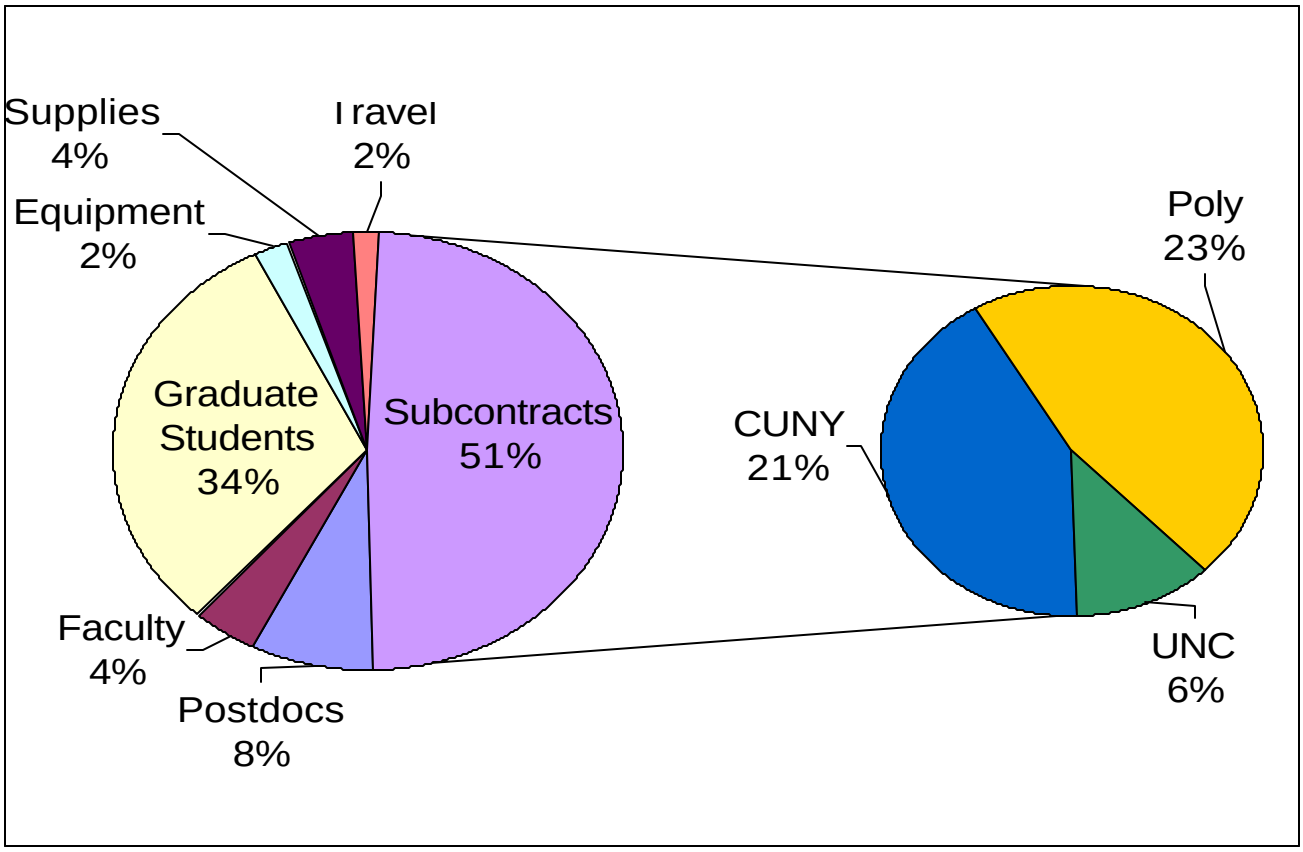
Awards 2000-03:

2000	Avi Ulman	**Alexander von Humboldt Foundation Research Award**
2000	Henry White	**President's Award for Distinguished PhD Dissertation**
2001	James Fenton	**New York State Prize for Undergraduate Minority Research**
2001	Kwan Woo Shin.	**President's Award for Distinguished PhD Dissertation**
2001	Yuxie Pu	**President's Award for Distinguished PhD Dissertation**
2002	Miriam Rafailovich	**Chancellors Award for Excellence in Research**
2002	Emily O'Brien	**NSF/Presidential Award for Excellence in Science Teaching**
2002	Rebecca Isseroff	**Grus Award for Excellence in Science Teaching**
2003	Rebecca Isseroff	**American Chemical Society Middle States Award for Excellence in . . Chemistry Instruction and hHigh School Independent Research**

2003 Young Soo Seo **President's Award for Distinguished PhD Dissertation**

Budget Distribution:





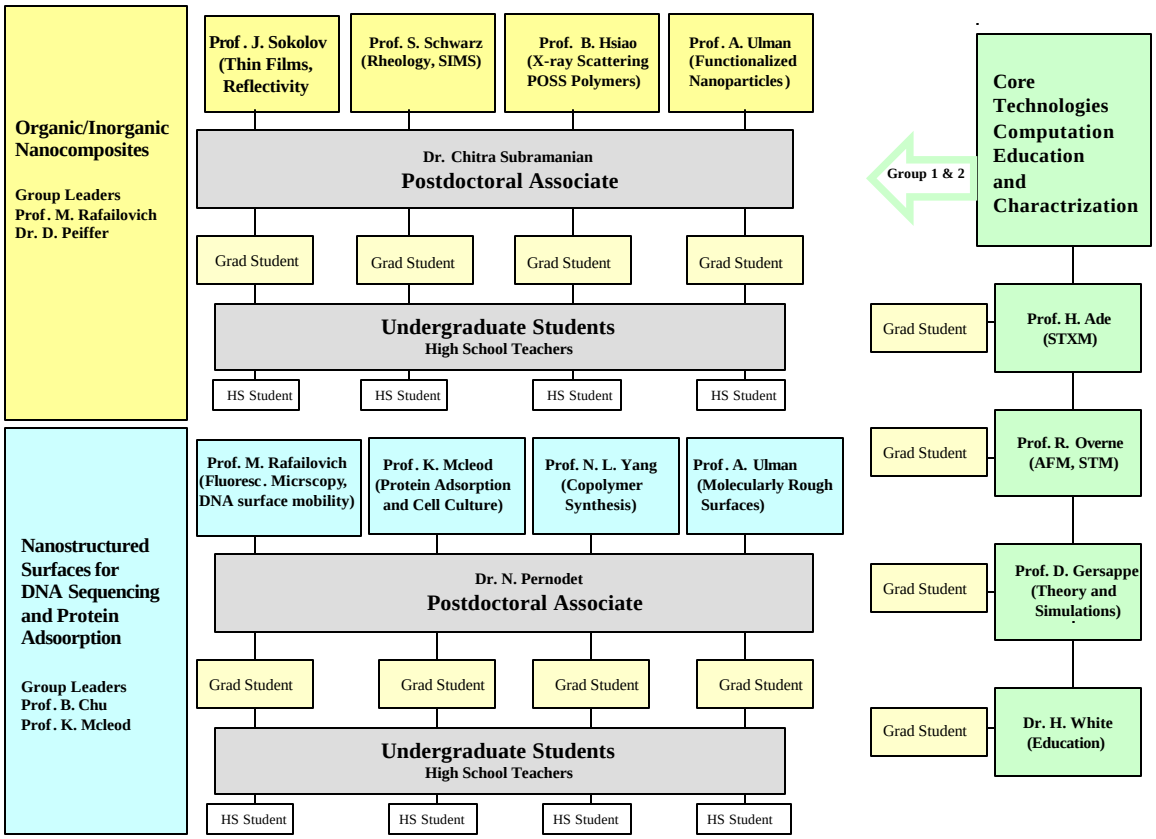
Garcia MRSEC
Polymers at Engineered Interfaces
SUNY Stony Brook • Polytechnic University • CUNY • North Carolina State University

EQUIPMENT PURCHASED 2000-2003

❖ **Leica Confocal Microscope**		$210,000	Cost sharing
❖ **Micro TA (Topometrix)**	$10,000 MRSEC	$50,000	Cost sharing
❖ **Dynamic Mechanical Analyzer (DMA)**	$10,000 MRSEC	$20,000	Cost sharing
❖ **Differential Scanning Calorimeter (DMC)**		$19,000	Cost sharing
❖ **Thermal Gravimetric Analyzer (TGA)**	$10,000 MRSEC	$10,000	Cost sharing
❖ **Computer Data Server**	$20,000 MRSEC		
❖ **Rheometrics Nitrogen Shield**		$50,000	Cost sharing
❖ **UHV Chamber and Accessories**		$50,000	Cost sharing
❖ **5 Data Analysis Stations**	$5000 MRSEC	$5,000	Cost sharing
❖ **2 Napco CO_2 Incubators**	$5000 MRSEC		
❖ **Fisher Autoclave**	$5000 MRSEC		
❖ **Coherent Sapphire Laser System**	$6000 MRSEC		
❖ **Thermogravimetric Analyzer**		$18,000	Cost sharing
❖ **Water Pump**		$3,000	Cost sharing
❖ **AFM Liquid Scanners**		$4,000	Cost sharing
❖ **FT-EPR Accessories**	$50,000 MRSEC		
❖ **Lesker Vacuum System**		$28,000	Cost sharing

GARCIA Philosophy:
Integration of Research with Education

- Research is conducted through Interdisciplinary Research Teams



- Students of all levels can participate effectively if proper communication channels exist.

Graduate Students and Post-Docs (Backbone)

Undergraduate and High School Students (Scouts)

RET High School Teacher (Glue)

Resear h Experie ce for Teachers

Goal: To allow the teachers to update their knowledge of materials technology and develop research programs that could be continued with their students at their home institutions.

Year 1: Familiarize with instrumentation, laboratory, literature.
Year 2: Select a topic for independent research.
Year 3: Complete enough research for publication.

Participants: 9 from 2000-2003

Name (yrs in Garcia)	Degree	Topic of interest	School
Krishnan Chirakkal (2)	PhD Chemistry	Synthesis of Metallic Nanoparticles	East Islip High School
Ron Occhiogrosso (4)	PhD Chem Eng.	Processing of Polymers in Supercritical Fluids	Locust Valley HS
Gary Ramonetti (2)	BS Biology & Education	Establishment of a Cell Culture Facility	John Glenn HS
Peter Spellane (1)	PhD Chemistry	Properties of Thin Film ICP-type Polymer (PANI-EB and PPE) Coatings and the Oxidation of Aluminum and Copper Substrates	Life Sciences Secondary School
Rebecca Isseroff (3)	MS Chemistry	Self Assembly of Nanoparticles in Langmuir Monolayers	Stella K Abraham HS
Hubert Mantz (1)	MS Polymer Science	Detwetting of Polymer Thin Films	Universitat Ulm
Gary Gustavson (1)	BE Bioengineering	Cell Proliferation on Polymer Surfaces	USDAN Center for Creative and Performing Arts
John Luckner Jerome (1)	MS Mathematics	Supercritical CO2 Processing of Thin Films	Suffolk Community College
James Dornicik (2)	BS Chemistry	Diffusion in polyelectrolytes	Ward Melville HS

Results:

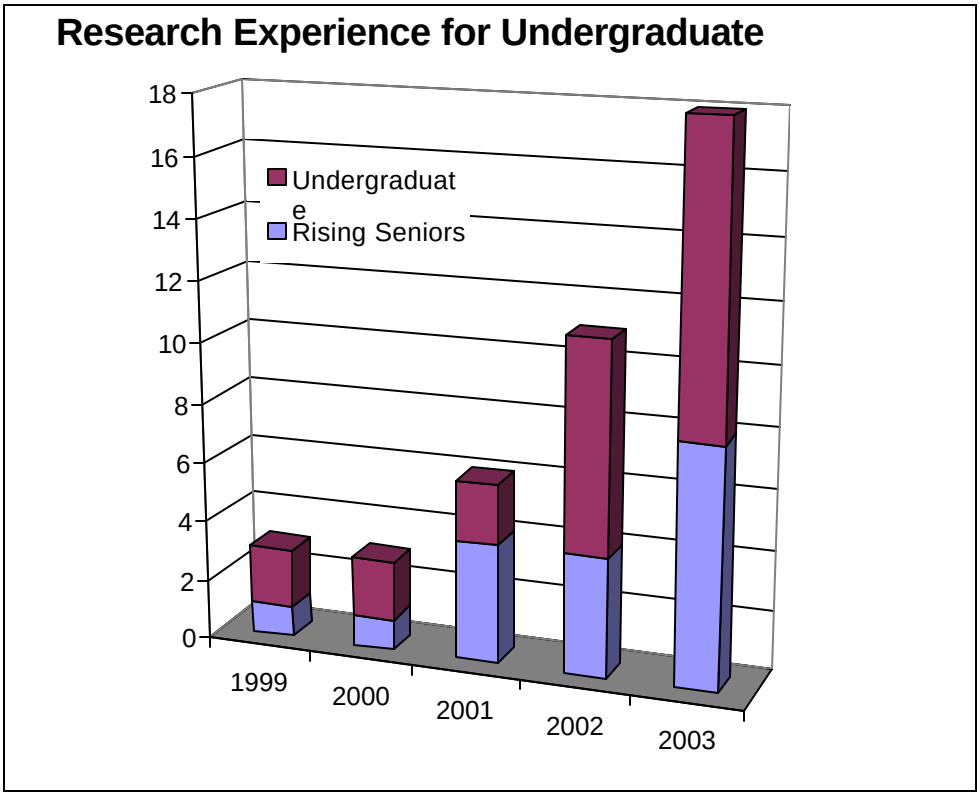
- **5 Publications in refereed journals, 3 Conference Proceedings, 1 Patent ,**
  2 Patent disclosures.
- **Pilot project in international RET-> Hubert Manz will continue towards PhD.**
- **R. Isseroff awarded ACS prize for teaching and research in Chemistry.**
- **All teachers have reported a rise of more than 30% in their research programs since they joined Garcia and half the teachers report significant job promotion.**

Research Experience for Undergraduates

Goals (1) Introduce undergraduates to careers in research, mentoring and teaching. (2) Help students chose appropriate post graduate professional track.

- Undergraduates work with grad student and mentor high school students.
- More than 80% of our REU undergrad students started in the high school program.
- The REU students return for an average of three years. Most complete two projects during that time and publish on average 1.5 manuscripts and or one patent disclosure.
- Target audience for international programs. Two have gone to Germany , one to Australia and three will go to France.
- **Rapid increase in enrollment, in proportion to the high school programs.**

- **90% enroll in professional schools-medicine, law, or business after graduation.**



Pilot Program: Journal of Adhesion will allow undergraduates to participate in the editorial process for one issue this year.

- **Solicit papers co-authored by an undergraduate students.**
- **Papers will pass usual referee procedure for the journal.**
- **Benefits: Teach students the editorial process**
- **Give students identification with scientific community.**
- **Open the journal to new ideas.**

Attention Undergraduate Students
Involved in Research

The Journal of Adhesion Science and Technology

is Now Accepting Submissions for a

Special Issue dedicated to Undergraduate Research in Adhesion Science

Submissions should be E-mailed to
Prof. M.H. Rafailovich
miriam.rafailovich@sunysb.edu
(PDF preferred or MS Word Files)

Deadline for Submissions: November 15, 2003

Editor: K. L. Mittal

Student Editorial Board for the Special Issue

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