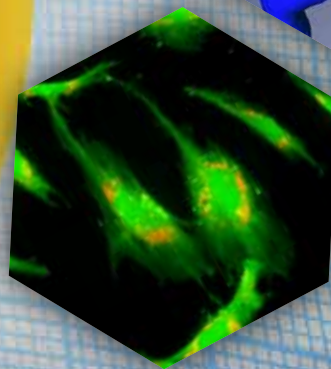
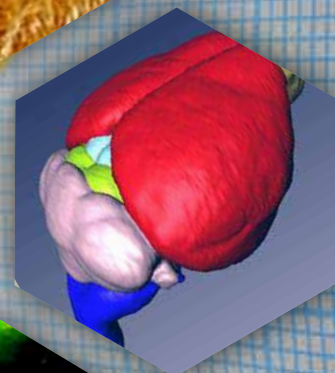
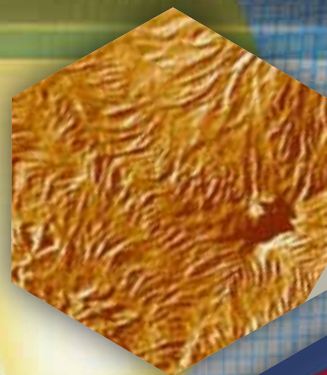
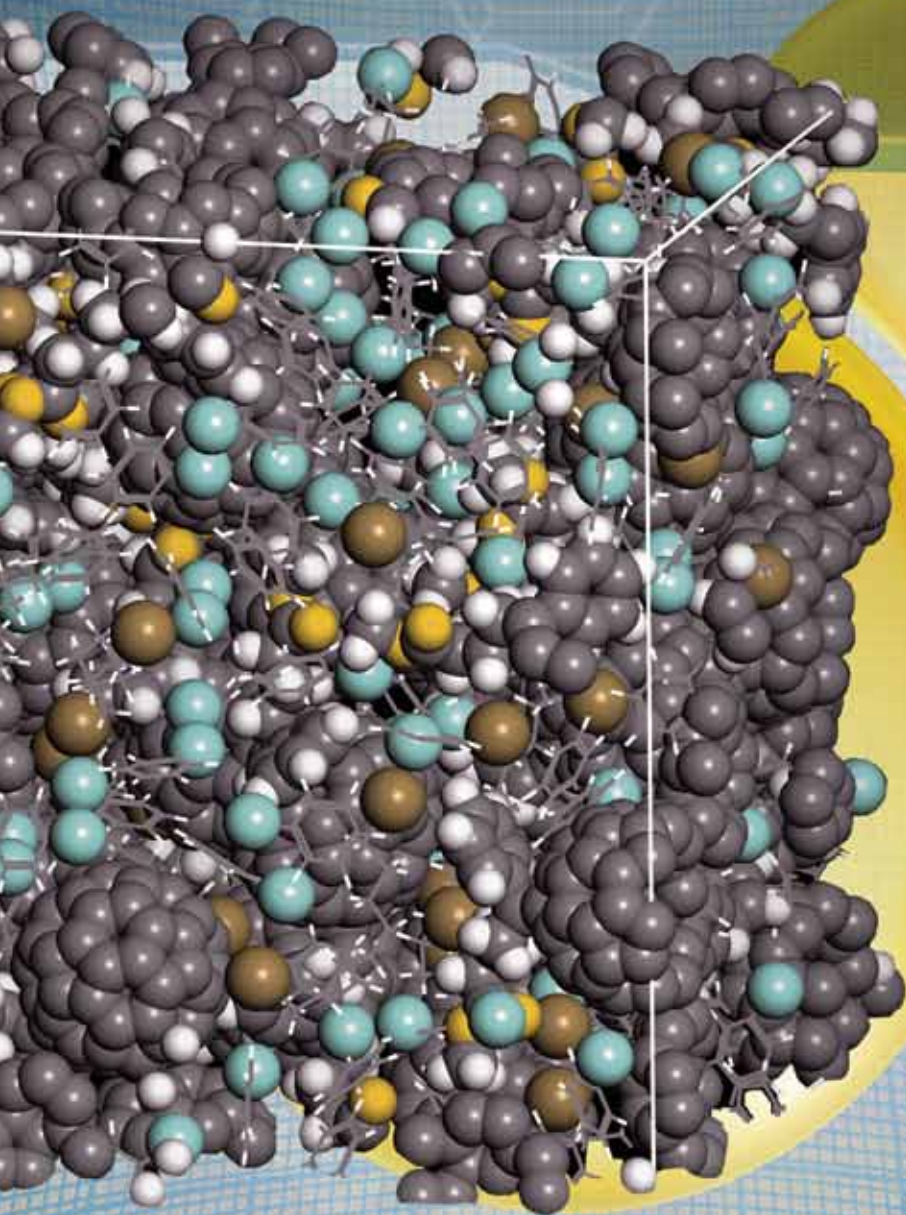


2013-2014

RESEARCH

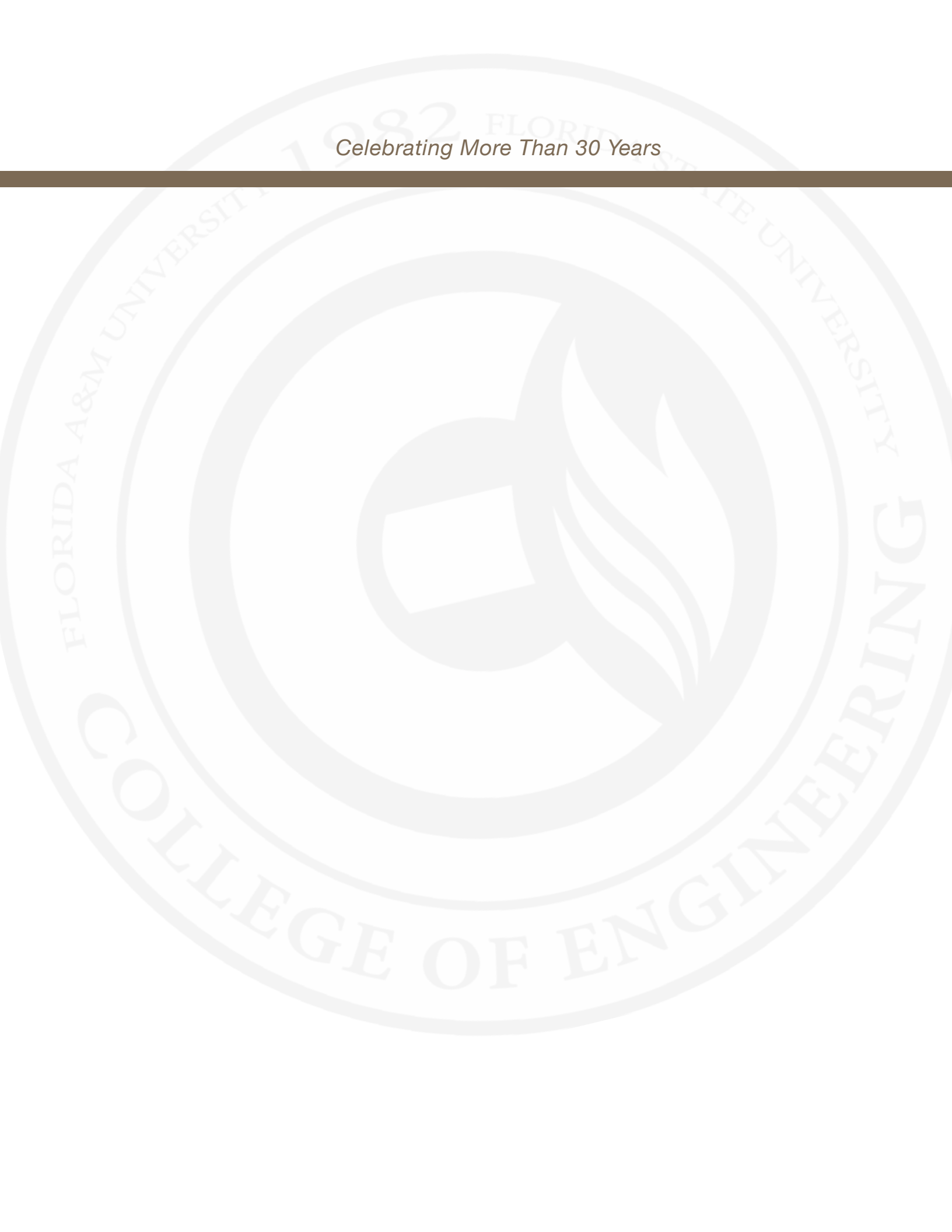
CHEMICAL & BIOMEDICAL ENGINEERING

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MESSAGE FROM THE CHAIR

Joel R. Fried, *Professor and Chair*



Dr. Joel R. Fried

On August 8, 2013, I became Chair of the Department of Chemical & Biomedical Engineering replacing the Interim Chair, John Collier, who provided a seamless transition for which I am very grateful.

Prior to my arriving in Tallahassee, I had been the Wright Brothers Endowed Chair in Nanomaterials at the University of Dayton. I began my academic career at the University of Cincinnati and served in a variety of positions from Assistant Professor to Professor and Head of the Department of Chemical Engineering and dual Professor of Medicine in Genomics. I became Professor Emeritus on September 1, 2010, at the time I moved to Dayton. The opportunity to join an outstanding department of distinguished faculty in both chemical and biomedical engineering with excellent facilities and opportunities for collaborations made my move from Ohio an easy decision. I look forward to working with our students and faculty to help our programs grow to new levels of excellence.

Our Department continues to grow with the appointment of Biwu Ma as Associate Professor, also this August. Biwu comes to us from Lawrence-Berkeley National Laboratory as one of three recent university-wide hires through a new strategic initiative in energy and materials. He earned MS and PhD degrees in Materials Science from the University of Southern California. Biwu's research focuses on the development of new types of functional materials that can be used for solar energy conversion and energy storage.

I am pleased to congratulate Professor Sam Grant on his recent promotion to Associate Professor with tenure and Professor Rufina Alamo, the Simon Ostrach Professor of Engineering, on her appointment as an FSU Distinguished Research Professor. Professor John Telotte has been recognized by the Florida Eta Chapter of Tau Beta Pi as the Outstanding Teacher in the Chemical and Biomedical Engineering Department. Professor Subramanian Ramakrishnan returned this summer from Summer Fellow positions at both Wright Patterson AFB and Argonne National Laboratory.

Our research productivity continues to grow with new major research funding from several agencies. Professor Ramakrishnan has received significant new funding from the Department of Defense, NASA and NSF. Stem cell research in our Biomedical Engineering program has been a focus of extensive grant funds from several agencies. These include a recent BRIGE award from the National Science Foundation and a GAP award from the FSU Research Foundation to Professor Yan Li, and two separate awards from the James King Biomedical Research Program (Florida Department of Health) — one to Professor Teng Ma and a second to Teng Ma in collaboration with Professor Sam Grant. Professor Grant also has won a subcontract on a recently awarded National Institutes of Health R01 grant to pursue the use of magnetic resonance imaging to map electrical pathways and activation in nervous tissue. In addition, Professor Jingjiao Guan has been awarded a National Science Foundation grant to integrate polyelectrolyte contact printing and aryldiazonium chemistry for nanopatterning.

All told, the 20 CBE faculty have generated over 10 patents, \$6 million in funding, 6 books or book chapters and numerous awards and honors just over the last five years.

CONTACT

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RESEARCH AREAS AND ALIGNMENTS

- **Biomedical Imaging** (Drs. Sam Grant, Teng Ma and Anant Paravastu)
- **Cellular & Tissue Engineering** (Drs. Sam Grant, Jingjiao Guan, Yan Li and Teng Ma)
- **Multi-Scale Theory, Modeling & Simulations** (Drs. Ravindran Chella and Joel Fried)
- **Nanoscale Science & Engineering** (Drs. Ravindran Chella, Joel Fried, Sam Grant, Jingjiao Guan, Daniel Hallinan, Egwu Kalu, Biwu Ma, Subramanian Ramakrishnan and Theo Siegrist)
- **Plasma Reaction & Electrochemical Engineering** (Drs Eric Kalu and Bruce Locke; Mr. Wright Finney)
- **Polymers & Complex Fluids** (Drs. Rufina Alamo, Ravindran Chella, John Collier, Joel Fried, Daniel Hallinan, Anant Paravastu and Subramanian Ramakrishnan)
- **Renewable & Advanced Power Production** (Drs. John Collier, Joel Fried, Daniel Hallinan, Egwu Kalu, Bruce Locke, Biwu Ma, Subramanian Ramakrishnan, John Telotte and Yaw Yeboah)

MISSION

The vision of the Department of Chemical and Biomedical Engineering is to serve the state and nation by becoming a leading educational and research program in chemical and biomedical engineering. We aim to capitalize on the fundamental strengths of chemical engineering in the study and application of multi-component, multiphase transport and reaction processes to make innovative and creative advances to solving pressing societal problems in human health, environment, and industry. The Department's mission statement follows:

The Mission of the Department of Chemical and Biomedical Engineering is to provide a high quality and modern education in the fundamental principles and practices of chemical and biomedical engineering. The fundamental unifying theme of chemical engineering is the study and application of multi-component, multiphase systems from the molecular to the macroscopic scales, with particular emphasis on molecular transport processes with chemical transformation, e.g., chemical or biochemical reactions. The biomedical engineering emphasis in the Department builds upon this chemical engineering strength, and is focused on cellular and biochemical transformations in natural and synthetic environments. An integral part of the education process involves faculty and students conducting groundbreaking and innovative research in areas of critical importance to our society. The Department seeks to prepare students for academic and professional work through classroom and laboratory instruction and research with modern experimental, mathematical, and computational tools.

Read more here: www.eng.fsu.edu/cbe

CHEMICAL AND BIOMEDICAL FACULTY



RUFINA ALAMO, Professor, Ph.D., Complutense University of Madrid
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RESEARCH INTERESTS: Polymer science and engineering | Crystallization and morphology | Structure-properties relations



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RESEARCH INTERESTS: Hybrid methods for transport of biomolecules in microfluidic and nanofluidic systems | Spinodal decomposition and nucleation of polymer blends under shear



JOHN COLLIER, Professor, Ph.D., Case Western Reserve University
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RESEARCH INTERESTS: Biomass to energy polymer processing | Elongational and shear rheology of polymer melts and concentrated solutions | Cellulosic solution in lyocell and ionic liquids | Magnetic effects on polymer processing



WRIGHT C. FINNEY, Associate in Research, M.S., Florida State University
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RESEARCH INTERESTS: Environmental engineering and hazards mitigation | Electrostatic processes | Aerosol science and particle charging



JOEL R. FRIED, Professor and Chair, Ph.D., University of Massachusetts
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RESEARCH INTERESTS: Membrane separation and transport, computational chemistry, molecular simulations, polymer blends and composites, biomimetic membranes, proton transfer in fuel cell membranes, ion and small molecule transport through membrane proteins.



SAMUEL C. GRANT, Associate Professor and Graduate Coordinator, Ph.D., University of Illinois. (850) 410-6158 | FAX (530) 706-4535 | grantsa@eng.fsu.edu
RESEARCH INTERESTS: Magnetic resonance microscopy and spectroscopy | Single cell analysis | Compartmental diffusion and exchange in cells and bioengineered constructs | Radio frequency MRI coils | MRI of neuro and muscular degeneration in chronic and acute disease states



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RESEARCH INTERESTS: Particulate nanodevices for gene delivery and biomedical imaging | Nanoscale and molecular manipulation of single DNA molecules for biosensing | Polymer micro/nanofabrication for tissue and cellular engineering

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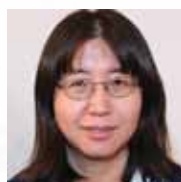
DANIEL HALLINAN, JR., Assistant Professor, Ph.D., Drexel University
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RESEARCH INTERESTS: Electrochemical energy storage | Polymer-inorganic composites for lithium batteries | Stress at block copolymer interfaces | Transport in polymer electrolyte membranes



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RESEARCH INTERESTS: Petroleum chemistry, exploration and processing | Hydrocarbon science and technology | Analytical chemistry – mass spectrometry | Environmental monitoring and controls | Lubricant oils and petrochemicals | Biomass fuels and chemicals



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RESEARCH INTERESTS: Renewable energy catalysis - biofuels and hydrogen | Environmental and biosystem catalysis | Electrochemical computations and modeling



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RESEARCH INTERESTS: Stem cell technology and engineering | Biomaterials | Cell processing and bioprocessing



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RESEARCH INTERESTS: Plasma reaction engineering | Metabolic engineering in muscle



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RESEARCH INTERESTS: Organic electronics | Solar energy conversion | Light emitting diode | Energy storage devices | Directed- and self-assembly of nanomaterials



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RESEARCH INTERESTS: Cell and tissue engineering | Biomaterials

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MBA, University of Florida; Research Associate, Center for Advanced Power Systems,
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RESEARCH INTERESTS: Controls | Modeling and simulation | Power systems



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RESEARCH INTERESTS: Novel biomaterials for therapeutic applications mechanisms
of protein aggregation and its role in human disease | Molecular structure and
dynamics using solid state NMR spectroscopy



SUBRAMANIAN RAMAKRISHNAN, Associate Professor, Ph.D., University of Illinois,
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RESEARCH INTERESTS: Colloidal science | Nanotechnology | Nanoparticle synthesis
and self-assembly | Rheology of complex fluids | Renewable energy
Biofuels | Bioseparations



LOREN B. SCHREIBER, Professor, Ph.D., California Institute of Technology
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RESEARCH INTERESTS: Undergraduate chemical engineering education | Pilot plant
design and operation | Safety of batch reaction and distillation



THEO SIEGRIST, Professor, Ph.D., Federal Institute of Technology (ETH)
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RESEARCH INTERESTS: Organic semiconductors | Structure-property relationship in
crystalline materials | Crystal growth | Materials for energy | X-ray diffraction



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University of Florida
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RESEARCH INTERESTS: Solubility phenomena | Fuel cell systems | Biodiesel
production



YAW D. YEBOAH, Professor and Dean, Ph.D., Massachusetts Institute of Technology
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RESEARCH INTERESTS: Electrocatalysis/heterogeneous catalysis | Combustion
and emission control | Oilfield scale formation | Coal and/or biomass conversion
processes | Petroleum and natural gas production and processing | Energy, materials
and the environment

RUFINA ALAMO NAMED FELLOW OF THE AMERICAN PHYSICAL SOCIETY

By Engineering News

Congratulations to Rufina Alamo, professor in chemical and biomedical engineering at the FAMU-FSU College of Engineering, on being elected a Fellow of the American Physical Society (APS).

Alan Chodos, associate executive officer of the American Physics Society, made the official announcement to Alamo: "I have the honor of informing you that the Council of the American Physical Society at its November 2012 meeting acted favorably on your nomination for Fellowship in the Society upon the recommendation of the Division of Polymer Physics. As you may know, election to Fellowship in the American Physical Society is limited to no more than one half of one percent of the membership. Election to APS Fellowship is recognition by your peers of your outstanding contributions to physics."

Alamo's Fellowship Certificate citation reads as follows:

"For her use of well-characterized materials and performance of carefully designed experiments to address structure-property relationships in polyolefins."

Alamo works with polyolefins that are simple large plastic molecules able to adopt a large variety of shapes. Unbranched, short-branched, long-branched, star-like, pom-pom like, comb-like and other types of polyolefins are feasible via relatively easy and inexpensive synthetic paths.

Used almost everywhere, the short and long-branched polyolefins cover about 80% of the total worldwide production of plastics. The two major types, polyethylene (PE) and polypropylene (PP) are often considered first for use in any application because of their excellent cost/performance value such as low density, easy recyclability, and processability.

Polyolefins are easy to fabricate into useful products (film wraps, green houses, carpeting, automobile parts, hospital gowns and hoses...) and have increasing design capability. Many, many products are made from them with targeted product applications matched to polyolefin branching and structure. For example, with few or no branches, the long molecules fold many times and pack in symmetric strong arrays with uses often geared to special applications, such as bullet-proof protective wear and orthopedic implants. Conversely, highly branched polyolefins cannot easily pack in symmetric arrays because the branches are in the way. The result is a softer, more elastic material such as film wraps, plastic bags, clothing and more. Alamo studies how these molecules fold to understand the performance of polyolefin materials.

Alamo's name and Fellowship citation appears in the March 2013 publication issue of APS News and on the Fellowship Page of the America Physics Society home page.

Bruce Locke, professor in chemical and biomedical engineering and previous chair of the department, upon learning of Alamo's nomination announced to the College at-large, "Please join me in congratulating Dr. Alamo for her Fellowship in the American Physical Society. Great work!"



Dr. Rufina Alamo, Professor

ENGINEERING FACULTY MEMBER RECEIVES TOP RESEARCH AWARD

By Barry Ray, FSU News



Dr. Anant Paravastu

Anant K. Paravastu, an assistant professor of chemical and biomedical engineering, has won a five-year NSF Faculty Early Career Development Award, also known as a CAREER Award, totaling \$404,992 to advance his research into “designer” proteins, an area of study that could contribute to breakthroughs in the emerging fields of regenerative medicine and nanotechnology.

NSF CAREER Awards are designated for scientists who are still in the early stages of their academic careers and are intended to help them build upon previous accomplishments in their areas of research.

Paravastu’s project, titled “Solid State NMR Characterization Of Molecular Structure And Self-Assembly Of Protein Nanofiber Matrices,” involves evaluating at the molecular level the self-assembly and self-healing processes, among other properties, of certain protein structures. The knowledge gained from his research could help lead to the development of a biologically inspired, “bottom-up” approach to nanomaterial construction with applications in regenerative medicine and nanotechnology.

“Recently, scientists have used insights gained from decades of studying the structural biology of naturally occurring proteins to engineer ‘designer’ proteins capable of forming nanofiber matrices, or tissue scaffolds,” Paravastu said. “These scaffolds show great promise in regenerative medicine; for example, recent reports indicate that they have the ability to support the healing of damaged neurons or the encapsulation of transplanted stem cells.

“Particularly interesting properties of these proteins include their ability to adapt their structures to environmental stimuli and regenerate their nanostructures following damage,” he added. “Through the full characterization of molecular structures and formation pathways for designer-protein tissue scaffolds, we seek to achieve unprecedented control of the biological, physical and chemical properties.”

In conducting his research, Paravastu employs an incredibly powerful analytical technique known as solid-state nuclear magnetic resonance (NMR) spectroscopy using tools located at the National High Magnetic Field Laboratory. With this technique, he utilizes high magnetic fields to measure the strengths, directions and temporary fluctuations of magnetic interactions between the atoms within a protein.)

Paravastu began his academic career at Florida State in 2008 after earning a doctorate in chemical engineering from the University of California, Berkeley and a bachelor’s degree from the Massachusetts Institute of Technology. He has also completed graduate work at Lawrence Livermore National Laboratory in Livermore, CA, and postdoctoral research at the National Institute of Diabetes & Kidney Diseases in Bethesda, Md. Yet despite all of his success, Paravastu remains modest about his CAREER Award.

“As much as I love my work, I am well aware that there is a great deal of excellent science being done by young professors in the United States,” he said. “The message I get from this success is that I benefited from strong support from FSU and effectively justified my project in terms that are consistent with the NSF review process. I am humbled by this honor and look forward to delivering on my promises.”

ONE STEP CLOSER TO 'MARKET' - INVENTION ASSOCIATED WITH DRUG TESTING RECEIVES TECH TRANSFER FUNDS

By Tom Butler, University Communications, FSU

Four innovative research projects were awarded a total of \$158,000 by the Florida State University Research Foundation to help move them from the laboratory to the marketplace.

The projects range in scope from a web-based autism detection and treatment system to new biosensors designed to quickly and accurately detect diseases such as cancer. Selected in the latest round of awards from Florida State's biannual \$250,000 Grant Assistance Program (GAP), the awards are intended to help each project reach new milestones on the road to real-world implementation. The winners of the GAP awards are researchers or teams of researchers who can most clearly identify the commercial viability of a product, process or license that will come from their efforts.

"Our latest GAP winners present some truly unique and tremendously beneficial technologies that could have a significant impact on society," said Vice President for Research Gary K. Ostrander. "Although they are still in the proof-of-concept phase, they help prove that the GAP competition is an excellent opportunity for our researchers to pitch their product ideas and seek out funding that is not often available at this stage of development."

Yan Li — Faster drug discovery using living tissue test environments — \$43,000.

Li, an assistant professor in the Department of Chemical and Biomedical Engineering, is developing a new tissue-based testing method that would enhance the ability of researchers to test the effects of pharmaceutical drugs and their ability to help treat and cure diseases. Using the GAP award, Li will be able to hire the necessary staff and purchase the equipment needed to move the project to its next stage of development.

For more information about GAP, visit www.research.fsu.edu/foundation.gap



Dr. Yan Li, Assistant Professor, Department of Chemical and Biomedical Engineering

Video link - <http://cdn.thinkcreative.com/previews/cuGEivbX-vxqzr7dM>

FACULTY HONORS

- Rufina Alamo was awarded the Mettler-Toledo Award for outstanding achievement by the North American Thermal Analysis Society.
- Rufina Alamo has been named to the Fellowship of the American Physical Society “for her use of well-characterized materials and performance of carefully designed experiments to address structure-property relationships in polyolefins.”
- Rufina Alamo was selected as one of the 2013 FSU Distinguished Research Professors.
- Egwu Kalu was awarded a 2010 Fulbright Fellowship to conduct research and educational activities in Nigeria.
- Bruce R. Locke was named a 2010 FSU Distinguished Research Professor.
- Subramanian Ramakrishnan was one of five FAMU faculty researchers recognized for “research excellence with caring” at the 2011 Florida A&M University Principal Investigator Appreciation and Researcher of the Year Awards.
- Theo Siegrist was awarded a 2008 Alexander von Humbolt Fellowship to conduct research in Germany and to continue collaborative work in the synthesis and analysis of a variety of inorganic materials including iron based superconductors and alkaline earth metal oxides.

FACULTY GRANTS

- Samuel C. Grant has been awarded a National Science Foundation, grant of \$1,843,363 for “MRI-R2: Development of an NMR Console for the 36 T Series Hybrid,” (PI: W. Brey, Co-PI: S.C. Grant).
- Samuel C. Grant has been awarded an NSF-NHMFL UCGP, of \$180,000 for “MR Imaging in the Far Field: Holographic Interferometry & Spatial Encoding at High Field.”
- Jingjiao Guan (PI), Tai Liu. Integration of Polyelectrolyte Contact Printing and Aryldiazonium Chemistry for Nanopatterning. Funded by the National Science Foundation. Total Award \$399,801.
- Jingjiao Guan has been awarded the James and Esther King Biomedical Research Program’s, New Investigator Research (NIR) Grant for “Array-Based Fiber FISH for Genetic Analysis of Lung Cancer,” with \$391,496 in research funding.
- Jingjiao Guan has receive a Technology Transfer Feasibility Grant of \$100,000 from Bankhead-Coley Cancer Research Program.
- Yan Li. BRIGE: Engineering a BioMatrix Library Derived from Induced Pluripotent Stem Cells. Funded by National Science Foundation. Total award \$174,737.
- Yan Li (PI) & Teng Ma. Decellularized Microspheres from Pluripotent Stem Cell Aggregates. Funded by FSU Research Foundation GAP Program. Total award \$43,000.

- Yan Li (Co-PI). Improving Time and Resource Efficiency with Capillary Nanofluidic Protein Detection. Funded by Florida State University, Equipment and Infrastructure Enhancement Grant (EIEG). Total award \$40,000.
- Yan Li (PI), Ravi Chella & Teng Ma. Introduction to current good manufacturing practices (cGMP) for future process engineers. Funded by Florida State University, Student Technology Committee. Total award \$32,009.
- Bruce R. Locke, Farrukh Alvi, Igor Alabugin, "Reaction Processes in Organic Droplet Spray Plasma Reactors," The National Science Foundation, \$351,999.
- Bruce R. Locke, National Science Foundation, Reaction Processes in Organic Droplet Spray Plasma Reactors, (P.I., co-P.I. Dr. Igor Alabugin, co-P.I. Dr. Farrukh Alvi), \$352,000.
- Teng Ma, James King Biomedical Research Program, Florida Department of Health, "Development of a Bioreactor Strategy for Scalable Expansion of Human Mesenchymal Stem Cell Aggregates for Heart Disease (3KF05)".
- Teng Ma (PI), Samuel C. Grant (co-PI), James King Biomedical Research Program, Florida Department of Health, "Translation of human mesenchymal stem cell therapy for stroke treatment: bioreactor expansion, functional activation, and intranasal delivery (4KB09)." \$400,000.
- Anant K. Paravastu has won a National Science Foundation Faculty Early Career Development Award, also known as a CAREER Award, totaling \$404,992 to advance his research into "designer" proteins.
- Subramanian Ramakrishnan, Ultra-light Weight Hybrids, Foams and Green Bodies: Structure-Property Relationships in Novel Polymer Grafted Magnetic Nanoparticles, NASA, \$120,000.
- Subramanian Ramakrishnan, Thurgood Marshall Fund - Sponsored by the Department of Defense Research and Engineering/Air Force Office of Scientific Research (AFOSR) – Undergraduate Research to Retain and Graduate Students in STEA (Science, Technology, Engineering, Agriculture & Mathematics) - \$25,000 over summer 2013. Structure-Property Relationships in Polymer Grafted Nanoparticles: Towards Novel Nanocomposites for Defense Applications.
- Subramanian Ramakrishnan, Towards Ultra-light Weight Hybrids, Foams and Green Bodies: Structure-Property Relationships in novel Polymer grafted nanoparticles, Department of Defense, S. Ramakrishnan, PI, \$478,449.
- Subramanian Ramakrishnan, Connecting Nanoscale Structure and Dynamics to Rheology and Flow of Glassy Nanocolloidal Suspensions, National Science Foundation, PI: R. Leheny, Co-PI: S. Ramakrishnan, Amount: \$349,771.
- Subramanian Ramakrishnan, Research Initiation Award Grant - Colloidal Mixtures: Microstructure and Mechanics, NSF, Principal Investigator: Subramanian Ramakrishnan, Amount: \$199,871.
- Theo Siegrist, US Department of Energy, DE-SC0008832, "Discovery and Crystal Growth of new Oxide Phases from Metal Fluxes," \$600,000.

PATENTS

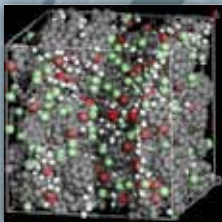
- Alamo, R.G., Coates, G.W., Ruiz-Orta, C., “Methods of constructing alkene-based homopolymer polyolefins having reduced crystallinity” to The Florida State University Research Foundation, Inc., U.S. Patent 8394908, March 12, 2013.
- Alamo, R.G., Coates, G.W., Ruiz-Orta, C., “Polyolefins Having Reduced Crystallinity” to The Florida State University Research Foundation, Inc., U.S. Patent 8389660, March 14, 2013.
- Alamo, R.G., Coates, G.W., Ruiz-Orta, C., “Methods of constructing polyolefins having reduced crystallinity using a late metal catalyst” to The Florida State University Research Foundation, Inc., U.S. Patent 8399589, March 19, 2013.
- Alamo, R.G., Coates, G.W., Ruiz-Orta, C., “Methods of constructing alkene-based copolymer polyolefins having reduced crystallinity” to The Florida State University Research Foundation, Inc., U.S. Patent 8399588, March 19, 2013.
- Alamo, R.G., Coates, G.W., Ruiz-Orta, C., “Methods of constructing polyolefins having reduced crystallinity using diimine based catalyst” to The Florida State University Research Foundation, Inc., U.S. Patent 8415441, April 9, 2013.
- Burlica, R., Locke, B.R., “Gliding arc electrical discharge reactors with improved nozzle configuration”, U.S. Patent 8444924 B2, May 21, 2013.
- Ma, T., Locke, B.R., “Materials and Methods for Cryopreserved Bone Constructs,” US Patent 8367059, Feb 4, 2013.

AWARDS AND APPOINTMENTS

- J. R. Fried, Air Force Summer Fellowship, WPAFB, Multiscale Simulation of a Low-Bandgap Copolymer for Bulk Heterojunction Solar Cells.
- Samuel Grant, SM IEEE, IEEE Tallahassee Area Section Chair and Sections Congress Representative
- Samuel Grant, Director of MRI User Program, National High Magnetic Field Laboratory and Associate Director, FSU Center for Advancing Exercise & Nutrition Research on Aging
- Samuel Grant, Organizing Chair, 42nd Southeastern Magnetic Resonance Conference, 2013
- Yan Li, Exceptional speaker award, Society for Biological Engineering (2012)
- Yan Li, First Year Assistant Professor Award, Florida State University (2012)
- Subramanian Ramakrishnan, Air Force Summer Fellowship, WPAFB, Towards Ultra-light Weight Hybrids, Foams and Green Bodies: Structure-Property Relationships in novel Polymer grafted nanoparticles.
- Subramanian Ramakrishnan, Visiting Faculty Fellowship, Argonne National Labs, Structure and Dynamics of Nanoparticle Suspensions and Gels.

BOOK CHAPTERS

- P. Bruggeman and B. R. Locke, Assessment of potential applications of plasma with liquid water, in *Low Temperature Plasma Technology: Methods and Applications*, P. Chu, and X. Lu (Eds.), Taylor and Francis Group, 2013.
- B. R. Locke, P. Lukes and J.-L. Brisset, Elementary Chemical and Physical Phenomena in Electrical Discharge Plasma in Gas-Liquid Environments and in Liquids, in *Plasma Chemistry and Catalysis, From Pollution Control to Energy Conversion*, V. I. Parvulescu, Marureanu, P. Lukes (Eds.), Wiley-VCH Verlag, 2012.
- P. Lukes, J.-L. Brisset, and B. R. Locke, Biological Effects of Electrical Discharge Plasma in Water and in as-Liquid Environments, in *Plasma Chemistry and Catalysis, From Pollution Control to Energy Conversion*, V. I. Parvulescu, Marureanu, P. Lukes (Eds.), Wiley-VCH Verlag, 2012.
- P. Lukes, B. R. Locke, J.-L. Brisset, Aqueous-Phase Chemistry of Electrical Discharge Plasma in Water and in Gas-Liquid Environments, in *Plasma Chemistry and Catalysis, From Pollution Control to Energy Conversion*, V. I. Parvulescu, Marureanu, P. Lukes (Eds.), Wiley-VCH Verlag, 2012.



Large figure on cover: "Molecular simulation of a mixture of PCMB [6,6-phenyl- C_{61} -butyric acid methyl ester) and an organic solvent (chlorobenzene) and iodine-containing organic dopant. PCBM is a chemically-modified fullerene (bucky ball) that serves as an electron acceptor. A plastic solar cell is formed by adding the polymer to the PCBM/solvent mixture and casting a thin film that is then dried to remove the solvent," J. R. Fried.



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