



Department of  
**CHEMICAL  
ENGINEERING**

# **PhD Program Informational Session**



**Whitney Stoppel, PhD**  
**Assistant Professor**  
**PhD Recruitment  
Coordinator**



**David Hibbitts, PhD**  
**Associate Professor**  
**Associate Chair for  
Graduate Studies**

Questions?

Email: [grad@che.ufl.edu](mailto:grad@che.ufl.edu)

**To request more information or a fee waiver code:**

[https://ufl.qualtrics.com/jfe/form/SV\\_8euYYHuEPU5MHwg](https://ufl.qualtrics.com/jfe/form/SV_8euYYHuEPU5MHwg)

The Department of Chemical Engineering at the University of Florida is excited to introduce you all to what we hope is a life changing experience, full of learning, amazing intellectual pursuits, new colleagues, and fun!





Department of  
**CHEMICAL  
ENGINEERING**

## PhD Program Informational Session

Questions?

Email: [grad@che.ufl.edu](mailto:grad@che.ufl.edu)



**Shirley Kelly**

**Graduate  
Academic Advisor**



**Sam Martinusen**

**PhD Candidate,  
Denard Lab**

**GRaduate Association  
for Chemical Engineers  
(GRACE) Recruiting Co-  
Chair**



**Gabrielle Donalson, MS**

**Graduate Academic  
Advisor and  
Administrator**



**Hanqin Zhao**

**PhD Candidate,  
Hagelin-Weaver Lab**

**GRaduate Association  
for Chemical Engineers  
(GRACE) Recruiting Co-  
Chair**

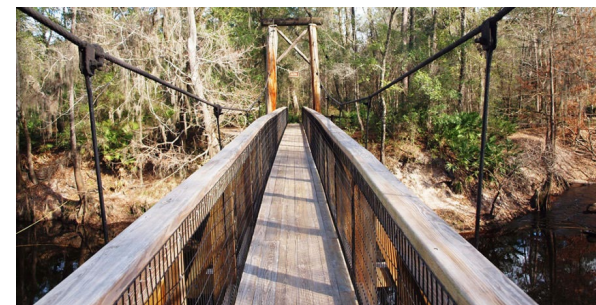
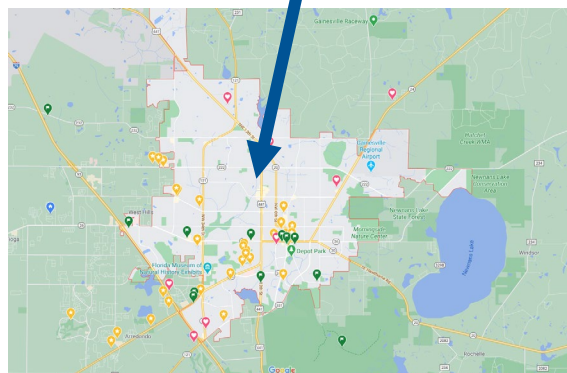
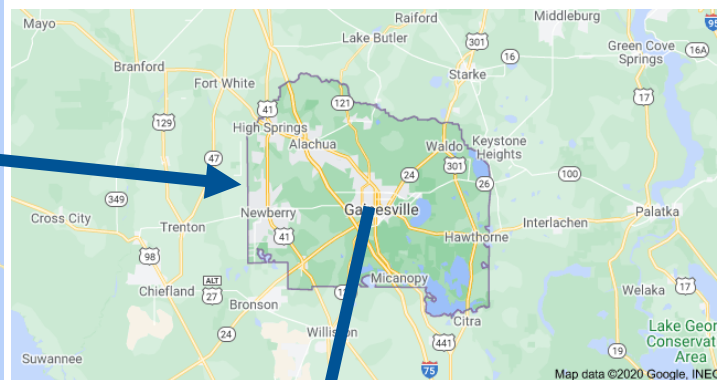
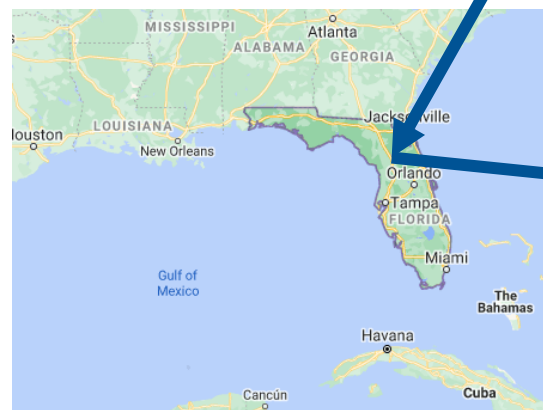
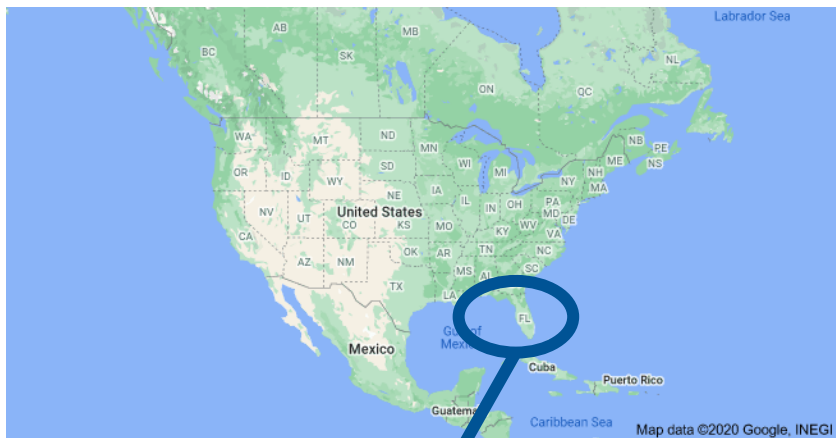


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**[https://ufl.qualtrics.com/jfe/form/SV\\_8euYYHuEPU5MHwg](https://ufl.qualtrics.com/jfe/form/SV_8euYYHuEPU5MHwg)**

**The Department of Chemical Engineering at the University of Florida is excited to introduce you all to what we hope is a life changing experience, full of learning, amazing intellectual pursuits, new colleagues, and fun!**





Hiking Trails and Wildlife



Local breweries







**30 Primary Faculty Members**

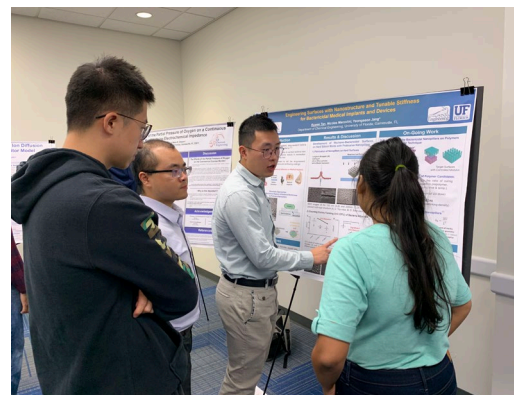
**450 Undergraduate Students**

**65+ PhD Students**

**50+ MS and ME Students**

## Welcoming and Inclusive Environment

- Committed to educating you via a rigorous chemical engineering curriculum and supporting your growth toward research excellence
- Outstanding research infrastructure & access to state-of-the-art centers
- Interdisciplinary research programs for interactions and collaborations across campus
- Diverse, socially & intellectually active student body that supports each other through the PhD program



## Engaged Student Organizations

- Peer mentoring
- Social and cultural events
- Community outreach
- Student-led research symposia





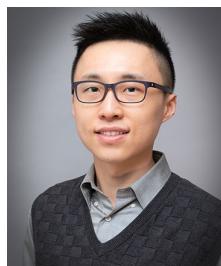
# UF Chemical Engineering Primary Faculty – 30 and Growing!



Butler



Choi



Chu



Crisalle



Denard



Dickinson



Funkenbusch



Hagelin-Weaver



Hages



Hibbitts



Jain



Jang



Jiang



Kopelevich



Ladd



Mérida



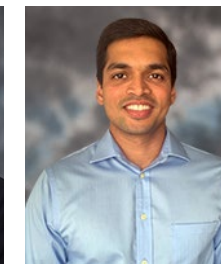
Moon



Narayanan



Orazem



Patankar



Ren



Restrepo-Flórez



Rinaldi-Ramos



Sampath



Stoppel



Svoronos



Tocco



Vasenkov



Weaver

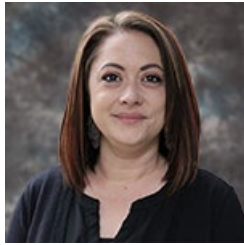


Ziegler

**We have excellent staff support to assist in our smooth and efficient function!**



**Sharla Alexander**



**Amanda Bolcar**



**Victor De La Cruz**



**Gabrielle Donalson**



**Kaitlynn Gravely**



**Janice Harris**



**Shirley Kelly**



**Randall Ledkins**



**Sherri McLeran**



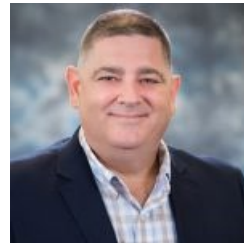
**Michelle Runyon**



**David Sante**



**Shaura Thomas**



**Preston Towns**



**Ricky Whitney**



# Supporting you along your PhD Journey

5 years of guaranteed funding for Ph.D. students making satisfactory progress

- Competitive Graduate Assistant Stipend
  - \$32,000 per year (your salary as a graduate employee)
- Full Tuition
- Health Insurance

Opportunities to win awards during your time in the department and HWCOC that can provide 1-time or continued “bonuses”

- Financial awards to students through HWCOC competitive fellowships
- Departmental awards for receiving external fellowships
- Travel awards for conference attendance
- Departmental awards for research achievements
- Departmental awards for service, leadership, and outreach



ChE Women's Mentoring Group  
Holiday Cookie and Gift Exchange

Our goal is to prepare students for fruitful and successful careers in many industrial, academic, and government sectors through rigorous scientific and engineering research experiences and curriculum

## Our Program:

- Prepares students to be entrepreneurs and business leaders
  - Engages students in technology transfer and offers workshops and courses/[graduate certificates](#) on *entrepreneurship*, business development and planning
  - Prepares students to be leaders in industry with graduate certificates in [engineering leadership](#)
    - [Collaboratory for women innovators](#)
    - Assistance in finding graduate internships with industry partners
  - Offers courses and training on instrumentation and equipment necessary for future employment
- Prepares students for academic careers
  - [Passport to Great Teaching graduate certificates](#) to prepare for academic careers
  - [Department of Engineering Education courses](#) and training opportunities
  - Mock Interviews for PhD program alumni
- Encourages a sense of community through [GRACE \(Graduate Association of Chemical Engineers\)](#)
  - Support from the Gator Nation and a strong alumni network



*Chemical Engineering Student Center*



*Thankful artwork created while celebrating "Diwaligiving" via GRACE event*



# PhD Program Requirements

## Highlights from the Handbook

- PhD students are 50% student (tuition covered) and 50% employee (graduate stipend)
- You remain fully enrolled for all 12 months of the year
- Summer stipends and tuition are paid similar to the spring and fall semesters
- 12 credits of core ChE graduate coursework are required along with regular registration and participation in Graduate Seminar during the time you are enrolled

ECH 6285 Transport Phenomena (3 credits)

ECH 6847 Advanced Mathematics for Chemical Engineering (3 credits)

ECH 6272 Molecular Basis (Molecular Thermodynamics) (3 credits)

ECH 6506 Chemical Engineering Kinetics OR ECH 6526 Reactor Design (3 credits for either)

- Students register for Graduate seminar every fall and spring
- UF ChE doesn't offer TA appointments
  - Students register for 4 credits of Supervised teaching at times to be determined by the Associate Chair for Graduate studies and your advisor (1 semester, usually 3<sup>rd</sup> year)
- Minimum of 12 additional credits of electives are required for graduation
  - Minimum of 6 credits must come from Chemical Engineering
  - 6+ may be completed from a variety of graduate level classes across campus or from the ChE Department



**Common Graduate Electives Offered in ChE on a 3–4-year rotating basis:**

- Polymer Science & Engineering
- Complex Fluids
- Management of Unit Operations Lab
- Managing Safety in the Chemical Industry
- Molecular Understanding of Catalysis
- Nanoscale Transport
- Research Methods in Chemical Engineering
- Semiconductor Device Fabrication Principles for Chemical Engineers
- Electron Transport
- Material Self-Assembly Over All Length Scales
- Surface Science
- Chemical Process Data Science
- Fundamentals of Artificial Neural Networks
- Statistics and Design of Experiments for Chemical Engineers
- Pharmaceutical Engineering
- Genetic Engineering/ Synthetic Biology
- Mechanobiology for Engineers/ Quantitative Analysis of Cellular Phenomena

The only requirement is that you take the 4 core ChE courses within the first two years (part of our qualifying exam component). After that, you can take electives when its convenient for your research plans and when courses that interest you are offered



### Graduate Electives Offered outside ChE Commonly Taken:

- EMA 6001 Properties of Materials - A Survey
- EMA 6105 Fundamentals and Applications of Surface Science
- EMA 6265 Mechanical Properties of Polymers
- EMA 6412 Synthesis and Characterization of Electronic Materials
- EMA 6507 Scanning Electron Microscopy and Microanalysis + EMA 6507L Scanning Electron Microscopy and Microanalysis Lab
- EMA 6510 Survey of Materials Analysis Techniques
- EMA 6516 X-Ray Methods for Materials Characterization + EMA 6516L X-Ray Methods Laboratory for Materials Characterization
- EGS 6101 Divergent Thinking
- EMA 6518 Transmission Electron Microscopy + EMA 6518L Transmission Electron Microscopy Laboratory
- EMA 6580 Science of Biomaterials
- BME 5703 Statistical Methods for Biomedical Engineering
- BME 5704 Advanced Computational Methods for Biomedical Engineering
- BME 6330 Cell and Tissue Engineering
- BME 6705 Mathematical Modeling of Biological and Physiological Systems
- EGM 5584 Biomechanics of Soft Tissue
- EGM 6855 Bio-Fluid Mechanics and Bio-Heat Transfer
- PHC 6002 Epidemiology of Infectious Diseases
- PHC 6003 Epidemiology of Chronic Diseases and Disability
- RSD 6401 Skeletal Muscle in Aging and Disease, and Implications for Rehabilitation
- STA 6166 Statistical Methods in Research I
- STA 6167 Statistical Methods in Research II
- STA 6208 Basic Design and Analysis of Experiments
- GMS 6841 Design and Analysis of Translational Research in Biomedical Sciences
- GMS 6861 Applied Biostatistics I
- PHC 6050C Biostatistical Methods I
- BMS6816 - Cancer Biology in Clinical Oncology
- EEE 5354L Semiconductor Device Fabrication Laboratory
- EEE 5776 Applied Machine Learning
- EGN 5442 Programming for Applied Data Science
- EGN 6446 Mathematical Foundations for Applied Data Science
- EGN 6640 Entrepreneurship for Engineers
- EGN 6642 Engineering Innovation
- EGN 6937 Engineering Fellowship Preparation
- EGS 6039 Engineering Leadership
- EGS 6050 Foundations in Engineering Education
- EGS 6056 Learning and Teaching in Engineering
- EGS 6626 Fundamentals of Engineering Project Management
- EGS 6628 Advanced Practices in Engineering Project Management
- EGS 6681 Advanced Engineering Leadership
- BME 6644 Pharmacokinetics
- BME 6322 Dynamics of Cellular Processes
- CHM 5275 The Organic Chemistry of Polymers

**Note that some courses on this list can count as ChE core courses. Confirm all registration with Shirley Kelly to ensure you are covering the requirements.**

The only requirement is that you take the 4 core ChE courses within the first two years (part of our qualifying exam component). After that, you can take electives when its convenient for your research plans and when courses that interest you are offered

# PhD Program Opportunities

## Many Certificates and Technical Training Opportunities

- Engineering Leadership Certificate
- Engineering Entrepreneurship Certificate
- Engineering Education Certificate
- Safety and UF ChE Unit Operations Training Opportunities
- Training and “Super-User” Status on instruments
- Training for Clean Room Operation
- Trainings for biological operation and cell culture
- Opportunities for graduate internships or co-ops





# PhD Program Opportunities

## 1<sup>st</sup> Year PhD Student Peer Mentoring

- Groups of 4-6 1<sup>st</sup> year PhD students are paired with a mentor (year 3+) to help them acclimate to UF ChE
- Social activities
- Study groups
- Method to dispel “hidden curriculum” in the PhD program



*A peer mentoring group hanging out at the campus bowling alley*

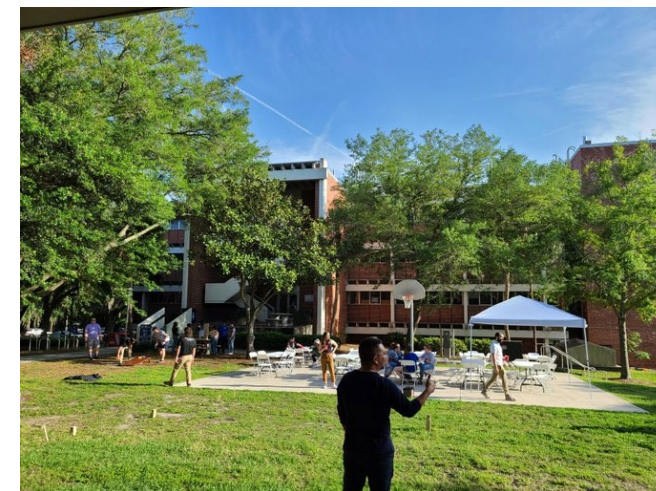




# PhD Program Opportunities

## First Friday Food Fling

- Monthly department sponsored Friday afternoon social events
- Food
- Music
- Lawn (outdoor) games



## Annual GRACE Symposium

- Research day with oral and poster presentations by graduate students
- Opportunities to win departmental travel awards
- Alumni keynote speakers





# Assignment of PhD Advisor and Project Selection Process

PhD project matching and advisor selection occurs in the first semester (fall) of the graduate program

**Advisor selection is not a part of our PhD acceptance process**

## Timeline during your 1<sup>st</sup> Fall Semester in the Department:

**Late August:** Overview of Research Projects and Opportunities

**August, September, and October:** Meetings, Discussions, and Tours of Research and Office Space

- New PhD students meet with at least 3-5 faculty members to discuss details of available projects
- Students learn about mentoring styles, attend group meetings, and read relevant papers
- Students meet with current PhD students to learn about the environment and group culture
- Students participate in the annual Fall GRACE Symposium to learn about on-going research efforts

**November:** Advisor Matching

- Students submit their ranking of projects to the Graduate Program Associate Chair
- Faculty convene to match students to available projects and advisors



### ADVANCED MATERIALS, DEVICES, AND NANOTECHNOLOGY

Won Tae Choi  
Helena Hagelin-Weaver  
Charles Hages  
David Hibbitts  
Piyush Jain

Yeongseon Jang  
Peng Jiang  
Joshua Moon  
Mark Orazem  
Fan Ren

Carlos Rinaldi-Ramos  
Janani Sampath  
Whitney Stoppel  
Kirk Ziegler



### BIOMOLECULAR ENGINEERING, CELLULAR ENGINEERING, AND SYNTHETIC BIOLOGY

Henry Chu  
Carl Denard  
Richard Dickinson  
Piyush Jain

Yeongseon Jang  
Mark Orazem  
Fan Ren  
Carlos Rinaldi-Ramos

Janani Sampath  
Whitney Stoppel  
Spyros Svoronos



### COMPLEX AND MULTIPHASE FLOW DYNAMICS

Jason Butler  
Henry Chu

Dmitry Kopelevich  
Anthony Ladd

Ranga Narayanan



### ENERGY, ENVIRONMENT, AND SUSTAINABILITY

Won Tae Choi  
Henry Chu  
Oscar Crisalle  
Helena Hagelin-Weaver  
Charles Hages

David Hibbitts  
Peng Jiang  
Joshua Moon  
Mark Orazem  
Juan Restrepo-Flórez

Janani Sampath  
Spyros Svoronos  
Sergey Vasenkov  
Jason Weaver  
Kirk Ziegler



### HETEROGENEOUS CATALYSIS AND SURFACE SCIENCE

Helena Hagelin-Weaver  
David Hibbitts

Jason Weaver  
Kirk Ziegler



### MODELING, THEORY, AND SIMULATION

Henry Chu  
David Hibbitts  
Dmitry Kopelevich

Anthony Ladd  
Ranga Narayanan  
Mark Orazem

Juan Restrepo-Flórez  
Janani Sampath  
Spyros Svoronos



### TRANSPORT, MOLECULAR THERMODYNAMICS, AND ELECTROCHEMICAL ENGINEERING

Jason Butler  
Won Tae Choi  
Henry Chu  
Charles Hages  
Dmitry Kopelevich

Anthony Ladd  
Joshua Moon  
Ranga Narayanan  
Mark Orazem  
Juan Restrepo-Flórez

Carlos Rinaldi-Ramos  
Sergey Vasenkov  
Kirk Ziegler





Research Groups in the department span the spectrum of skills from simulation and modeling to hands-on benchwork

Computational

Experimental



In some groups, students perform both benchwork and computational work. In other groups, students really focus on one skill over another. For more information, contact the professor or students in their group to get a better idea of the group organization

## UF Department of Chemical Engineering — Research Spotlight: Biomolecular Engineering, Cellular Engineering, and Synthetic Biology

*Over \$15M from NIH, NSF, and DOD to fund bio-related research in 2021–2022*



**Prof. Carlos Rinaldi-Ramos**

*We develop nanoparticles to track immunotherapies and to monitor disease progression in cancer and brain injuries.*

- NIH R21 in 2022: \$375k
- NIH R21 in 2022: \$400k
- NIH R01 in 2022: \$1.9M



**Asst. Prof. Carl Denard**

*We reprogram enzymes to catalyze post-translational modifications to improve biomedicine, biotechnology, and gain fundamental insights.*

- NIH R21 in 2022: \$405k
- NIH R35 in 2022: \$1.8M



**Asst. Prof. Piyush Jain**

*We discover and engineer gene editing tools (like CRISPR) to improve the detection and treatment of diseases.*

- NIH R21 in 2021: \$419k
- NIH R21 in 2022: \$419k
- NIH R35 in 2022: \$1.8M

**Asst. Prof. Whitney Stoppel**

*We leverage insect diversity to create natural materials for healthcare applications through environmental and genetic regulation of proteins to guide polymer function.*

- NIH R35 in 2022: \$1.8M
- DoD CDMRP in 2021: \$304k



**Asst. Prof. Yeongseon Jang**

*We create bioinspired materials that serve as synthetic platforms which mimic sophisticated living functions for biomedical applications.*

- NSF CAREER in 2021: \$409k
- NSF MCB in 2021: \$651k



**Prof. Mark Orazem**

*We use models and impedance spectroscopy to study electrochemistry of neural stimulation electrodes used to treat common degenerative diseases.*

- NIH U01 in 2022: \$4.4M



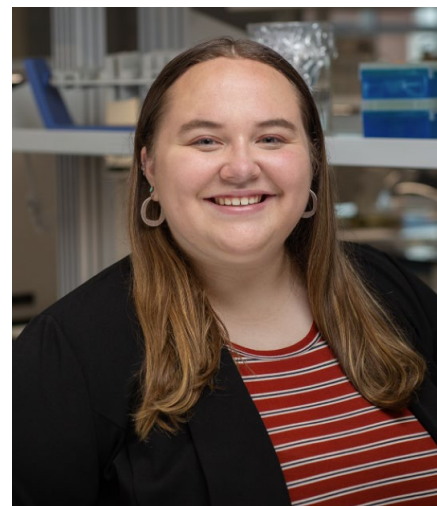


# Successful support during your PhD can lead to many outcomes

## Fellowships to support your research

**Victor Rivera-Llabres**

*NSF Graduate Research  
Program (NSF GRFP)  
Fellowship Recipient  
Rinaldi-Ramos Lab*



**Marisa Pacheco**  
**REU 2019**

*NSF Graduate Research  
Program (NSF GRFP)  
Fellowship Recipient  
Stoppel Lab*

**Elizabeth Aikman**

*NSF Graduate Research  
Program (NSF GRFP)  
Fellowship Recipient  
Stoppel Lab*



**Andrew Simonson**  
**REU 2021**

*NSF Graduate Research  
Program (NSF GRFP)  
Fellowship Recipient  
1<sup>st</sup> Year PhD Student*

## Successful support during your PhD can lead to many outcomes

### Awards for Excellence in Research, Teaching, Leadership and Service

#### 2021-2022 Excellence in PhD Research

- *Alexander Hoffman*
- *Julie Jameson*
- *Sitong Liu*
- *Long Nguyen*
- *Marisa Pacheco*
- *Xinyi Xia*
- *Chen You*

#### 2021-2022 Ray W. Fahien Graduate Teaching Award in Chemical Engineering

- *Hayden Good*
- *Igin Ignatius*

#### 2021-2022 Excellence in Leadership and Service

- *Alexander Jess*
- *Aniruddha Kulkarni*
- *Ambar Velazquez*

#### 2022-2023 PhD Peer Mentoring Award

- *Marisa Pacheco*
- *Jackson Powers*
- *Hansel Montalvo*



# Successful support during your PhD can lead to many outcomes

## Strong Publications and Publication Records



**Long T. Nguyen**  
PhD Candidate  
Jain Lab

### eBioMedicine

Part of THE LANCET *Discovery Science*

Volume 77, March 2022, 103926

Articles

A thermostable Cas12b from *Brevibacillus* leverages one-pot discrimination of SARS-CoV-2 variants of concern

Long T. Nguyen <sup>a</sup>, Nicolas C. Macaluso <sup>a</sup>, Brianna L.M. Pizzano <sup>b</sup>, Melanie N. Cash <sup>c</sup>, Jan Spacek <sup>e</sup>, Jan Karasek <sup>f</sup>, Megan R. Miller <sup>d</sup>, John A. Lednický <sup>d</sup>, Rhoel R. Dinglasan <sup>d</sup>, Marco Salemi <sup>c</sup>, Piyush K. Jain <sup>a, i</sup>



ARTICLE

<https://doi.org/10.1038/s41467-020-18615-1>

OPEN

Enhancement of trans-cleavage activity of Cas12a with engineered crRNA enables amplified nucleic acid detection

Long T. Nguyen<sup>1</sup>, Brianna M. Smith<sup>1</sup> & Piyush K. Jain<sup>1,2</sup>



Methods

Volume 203, July 2022, Pages 116-124



CRISPR-ENHANCE: An enhanced nucleic acid detection platform using Cas12a

Long T. Nguyen <sup>a</sup>, Jeevan Gurijala <sup>a</sup>, Santosh R. Rananaware <sup>a</sup>, Brianna L.M. Pizzano <sup>b</sup>, Brandon T. Stone <sup>c</sup>, Piyush K. Jain <sup>a, d</sup>

**communications  
medicine**

ARTICLE

<https://doi.org/10.1038/s43856-021-00066-4>

OPEN

Clinical validation of engineered CRISPR/Cas12a for rapid SARS-CoV-2 detection

Long T. Nguyen<sup>1</sup>, Santosh R. Rananaware<sup>1</sup>, Brianna L. M. Pizzano <sup>b</sup>, Brandon T. Stone<sup>3</sup> & Piyush K. Jain <sup>b, 1,4</sup>

**medRxiv**

THE PREPRINT SERVER FOR HEALTH SCIENCES



**BMJ** Yale

**Engineering Highly Thermostable Cas12b via De Novo Structural Analyses for One-Pot Detection of Nucleic Acids**

Long T. Nguyen, Santosh R. Rananaware, Lilia G. Yang, Nicolas C. Macaluso, Julio E. Ocana-Ortiz, Katelyn S. Meister, Brianna L.M. Pizzano, Luke Samuel W. Sandoval, Raymond C. Hautamaki, Zoe R. Fang, Sara M. Joseph, Grace M. Shoemaker, Dylan R. Carman, Liwei Chang, Noah R. Rakestraw, Jon F. Zachary, Sebastian Guerra, Alberto Perez, Piyush K. Jain

doi: <https://doi.org/10.1101/2022.10.02.22280626>

# Successful support during your PhD can lead to many outcomes

## Strong Publications and Publication Records



**Xinyi Xia**  
PhD Candidate  
2<sup>nd</sup> Year Student  
Ren Lab

### ECS Transactions

#### Ga<sup>+</sup> Focused Ion Beam Damage in n-type Ga<sub>2</sub>O<sub>3</sub> and Its Recovery after Annealing Treatment

Xinyi Xia<sup>1</sup>, Nahid Al-Mamun<sup>2</sup>, Warywoba Daudi<sup>3</sup>, Fan Ren<sup>1</sup>, Aman Haque<sup>4</sup> and Stephen J Pearton<sup>1</sup>

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[ECS Transactions, Volume 109, Number 5](#)

Citation Xinyi Xia et al 2022 ECS Trans. 109 3



### Journal of Vacuum Science & Technology A

HOME BROWSE INFO FOR AUTHORS COLLECTIONS

Home > Journal of Vacuum Science & Technology A > Volume 40, Issue 5 > 10.1116/5.0099892

Full • Submitted: 20 May 2022 • Accepted: 19 July 2022 • Published Online: 10 August 2022

#### Ga<sup>+</sup>-focused ion beam damage in n-type Ga<sub>2</sub>O<sub>3</sub>

Journal of Vacuum Science & Technology A 40, 053403 (2022); <https://doi.org/10.1116/5.0099892>

Xinyi Xia<sup>1</sup>, Nahid Sultan Al-Mamun<sup>2</sup>, Daudi Warywoba<sup>3</sup>, Fan Ren<sup>1</sup>, Aman Haque<sup>2</sup>, and S. J. Pearton<sup>4</sup>



### Journal of Vacuum Science & Technology A

HOME BROWSE INFO FOR AUTHORS COLLECTIONS

Home > Journal of Vacuum Science & Technology A > Volume 40, Issue 5 > 10.1116/6.0002033

Full • Submitted: 21 June 2022 • Accepted: 29 June 2022 • Published Online: 29 July 2022

#### Thermal stability of band offsets of NiO/GaN

Journal of Vacuum Science & Technology A 40, 053401 (2022); <https://doi.org/10.1116/6.0002033>

Xinyi Xia<sup>1</sup>, Jian-Sian Li<sup>1</sup>, Chao-Ching Chiang<sup>1</sup>, Timothy Jinsoo Yoo<sup>2</sup>, Fan Ren<sup>1</sup>, Honggyu Kim<sup>2</sup>, and S. J. Pearton<sup>2,a)</sup>

### ECS Journal of Solid State Science and Technology

#### Radiation Damage in the Ultra-Wide Bandgap Semiconductor Ga<sub>2</sub>O<sub>3</sub>

Xinyi Xia<sup>9,1</sup>, Jian-Sian Li<sup>9,2</sup>, Ribhu Sharma<sup>2</sup>, Fan Ren<sup>10,1</sup>, Md Abu Jafar Rasel<sup>3</sup>, Sergei Stepanoff<sup>4</sup>, Nahid Al-Mamun<sup>3</sup>, Aman Haque<sup>3</sup>, Douglas E. Wolfe<sup>4</sup>, Sushrut Modak<sup>5</sup> , Leonid Chernyak<sup>5</sup>, Mark E. Law<sup>8,6</sup>, Ani Khachatryan<sup>7</sup> and S. J. Pearton<sup>10,2</sup> [— Hide full author list](#)

Published 2 September 2022 • © 2022 The Electrochemical Society ("ECS"). Published on behalf of ECS by IOP Publishing Limited

[ECS Journal of Solid State Science and Technology, Volume 11, Number 9](#)

Citation Xinyi Xia et al 2022 ECS J. Solid State Sci. Technol. 11 095001

### Journal of Physics D: Applied Physics

#### PAPER

#### Annealing temperature dependence of band alignment of NiO/β-Ga<sub>2</sub>O<sub>3</sub>

Xinyi Xia<sup>1</sup>, Jian-Sian Li<sup>1</sup>, Chao-Ching Chiang<sup>1</sup>, Timothy Jinsoo Yoo<sup>2</sup>, Fan Ren<sup>1</sup>, Honggyu Kim<sup>2</sup> and S J Pearton<sup>3,2</sup>

Published 14 July 2022 • © 2022 IOP Publishing Ltd

[Journal of Physics D: Applied Physics, Volume 55, Number 38](#)


Citation Xinyi Xia et al 2022 J. Phys. D: Appl. Phys. 55 385105

Research from the department is published in a variety of academic journals, highlighting the efforts of the research teams!

Science Advances

nature reviews methods primers

### Electrochemical impedance spectroscopy

[Shangshang Wang](#), [Jianbo Zhang](#), [Oumaïma Gharbi](#), [Vincent Vivier](#), [Ming Gao](#) & [Mark E. Orazem](#) 

[Nature Reviews Methods Primers](#) **1**, Article number: 41 (2021) | [Cite this article](#)

2940 Accesses | 12 Citations | 17 Altmetric | [Metrics](#)



### Alkane Activation and Oxidation on Late-Transition-Metal Oxides: Challenges and Opportunities

Rachel Martin,<sup>||</sup> Minkyu Kim,<sup>||</sup> Aravind Asthagiri, and Jason F. Weaver\*

nature communications

### Enhancement of trans-cleavage activity of Cas12a with engineered crRNA enables amplified nucleic acid detection

[Long T. Nguyen](#), [Brianna M. Smith](#) & [Piyush K. Jain](#) 

[Nature Communications](#) **11**, Article number: 4906 (2020) | [Cite this article](#)

### Contrasting Arene, Alkene, Diene, and Formaldehyde Hydrogenation in H-ZSM-5, H-SSZ-13, and H-SAPO-34 Frameworks during MTO

Mykela DeLuca, Christina Janes, and David Hibbitts\*



### Perfusion, cryopreservation, and nanowarming of whole hearts using colloiddally stable magnetic cryopreservation agent solutions

Andreina Chiu-Lam<sup>1</sup>, Edward Staples<sup>2</sup>, Carl J. Pepine<sup>3</sup>, Carlos Rinaldi<sup>1,4\*</sup>

### Tuning the Structural Integrity and Mechanical Properties of Globular Protein Vesicles by Blending Crosslinkable and NonCrosslinkable Building Blocks

Ruwen Tan,<sup>‡</sup> Jooyong Shin,<sup>‡</sup> Jiwoong Heo, Blair D. Cole, Jinkee Hong, and Yeongseon Jang\*



### Thermal Decomposition Synthesis of Iron Oxide Nanoparticles with Diminished Magnetic Dead Layer by Controlled Addition of Oxygen

Mythreyi Unni,<sup>†</sup> Amanda M. Uhl,<sup>‡</sup> Shehaab Savliwala,<sup>†</sup> Benjamin H. Savitzky,<sup>||</sup> Rohan Dhavalikar,<sup>†</sup> Nicolas Garraud,<sup>§</sup> David P. Arnold,<sup>§</sup> Lena F. Kourkoutis,<sup>¶,‡</sup> Jennifer S. Andrew,<sup>‡</sup> and Carlos Rinaldi<sup>\*,†,||,Ⓜ</sup>

<sup>†</sup>Department of Chemical Engineering, <sup>‡</sup>Department of Materials Science and Engineering, <sup>||</sup>Interdisciplinary Microsystems Group, Department of Electrical and Computer Engineering, and <sup>‡</sup>J. Crayton Pruitt Family Department of Biomedical Engineering, University of Florida, Gainesville, Florida 32611, United States

<sup>§</sup>Department of Physics, <sup>¶</sup>Applied & Engineering Physics, and <sup>Ⓜ</sup>Kavli Institute at Cornell for Nanoscale Science, Cornell University, Ithaca, New York 14853, United States

### Electro-hydrodynamic concentration of genomic length DNA<sup>‡</sup>

Mert Arca, Anthony J. C. Ladd\* and Jason E. Butler\*

Soft Matter



# PHD STUDENTS FROM UF CHE ARE EMPLOYED ACROSS THE GLOBE!



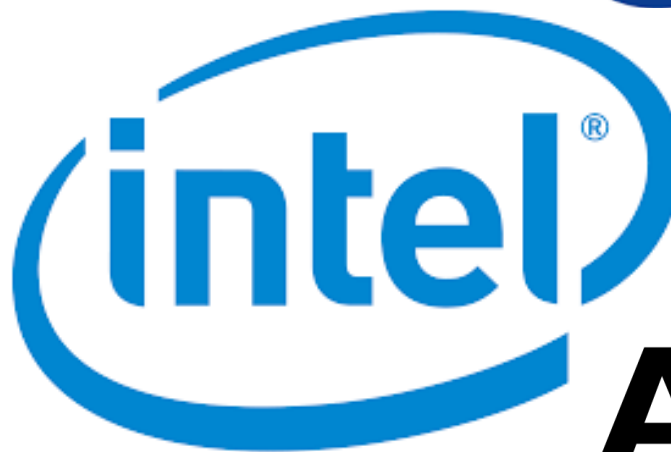
MOTOROLA



ExxonMobil



Oregon State  
University



NOVARTIS



## Chemical Engineering Buildings and Facilities



### ***Chemical Engineering Building***

- Houses most faculty offices and some research labs
- 3-story unit operations laboratory
- Conference rooms
- Copy room
- Classrooms
- Faculty and student mailboxes
- PhD student office spaces



### ***Chemical Engineering Student Center***

- Funded 100% by Alumni donations
- Designed by students and faculty
- Multiple study and collaboration spaces
- Vast, multi-story atrium for social events
- Academic advising suite
- CHE Administration offices\*



# Wertheim Laboratory for Engineering Excellence

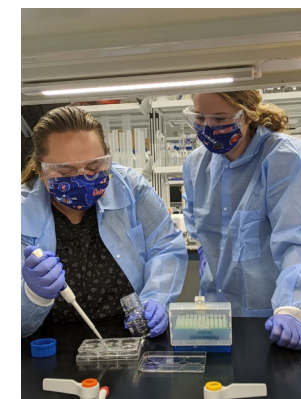
- 21,000 sq. ft. of collaborative research space
- \$3.8M in new research equipment for PhD student use
- Interdisciplinary research floor with open bench spaces and grad student offices
- Wertheim Engineers' Biotech Organization (WEBiO) organizes interdisciplinary social, research, and professional development activities in the building

## Chemical Engineering Research Groups in Wertheim Building:

Whitney Stoppel

Piyush Jain

Carl Denard





Easy WALKING access to state-of-the-art facilities!

PhD students have the opportunity to learn how to use specialty equipment

Equipment is managed by PhD level scientists and engineers who offer weekly trainings, brown bag learning lunches, webinars, and other professional development opportunities

Students can easily navigate collaborative efforts across campus without even getting in the car



# Application Information

Priority deadline: December 5

- **Application fee waivers expire on December 5<sup>th</sup>**
- Ensure submission by December 15<sup>th</sup> for full consideration
- GRE is not required for any application to the UF ChE PhD Program
- TOEFL or similar scores need to arrive at UF by the **first week of January** for applicants to remain under consideration
- Please make sure recommendation letter writers are timely with their recommendation letter submission, but note that these do not need to be in by Dec. 5<sup>th</sup> and won't prevent you from using the fee waiver code (ideally by ~Dec. 16<sup>th</sup>)



More information, including [methods to obtaining application fee waivers](#) and detailed Application Preparation Information can be found on [our ChE PhD FAQs Page](#)



# Application Requirements

## Fall 2023 PhD Application includes:

- Application forms via the UF Graduate School  
<https://admissions.ufl.edu/apply/graduate/>
- Official transcripts (must be physically mailed to the UF admissions department- unofficial transcripts are ok for the initial submission)
- Personal statement (1-2 pages)
- ~2-page CV/resume
- 3+ recommendation letters from professors
- English Language Proficiency demonstration is waived for students from University of Puerto Rico at Mayagüez and many other countries where English is the first language
  - Reach out to the UF International Office for more info on this



New Wertheim Laboratory for  
Engineering Excellence



# Application Components

## Personal statement (~2 pages)

- This is where you communicate your goals and motivation for pursuing a PhD degree
- Share with us why UF would be a great place for you to achieve your goals
- Explain to us your personal drive and motivations for your own career path and how getting a PhD will put you on a path toward your goals
- Describe how you have overcome challenges or persevered (if applicable)
- Tell us about your previous research or industry experiences and the influence these have had on your decision to pursue a PhD
- Comment on the types of research or topics that interest you (see our [ChE Viewbook](#))
  - Identify faculty members at UF that meet these goals (if applicable)
- Comment on your leadership or outreach experiences and how they shaped you as a chemical engineer
- Comment on your experiences in scientific communication



# Opportunities for English Language Proficiency:

Online: <https://global.fiu.edu/for-students/english-language-institute/>

At UF: <https://eli.ufl.edu/>

Other Florida Schools:

[https://www.fscj.edu/academics/english-language-programs/english-language-institute-\(eli\)](https://www.fscj.edu/academics/english-language-programs/english-language-institute-(eli))

<https://cies.fsu.edu/>

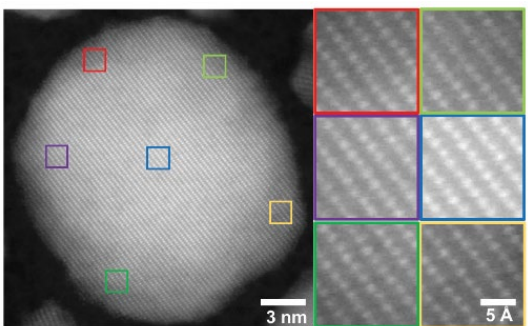
Information on English Language Requirements for PhD Applications:

<https://admissions.ufl.edu/apply/graduate/international>

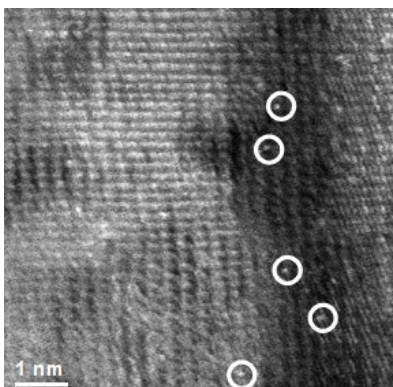
Remember, that while we require the TOEFL or something similar, we do NOT require any type of GRE.

## Advanced Materials, Devices, and Nanotechnology

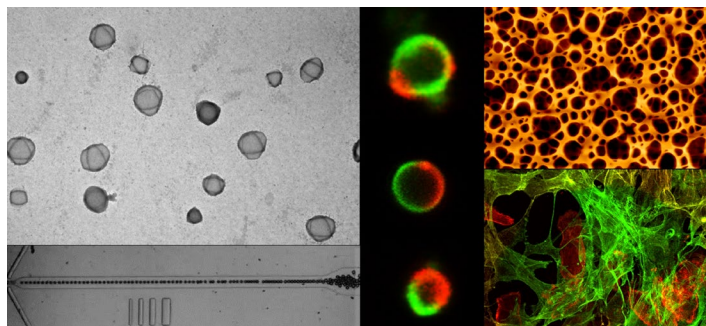
We develop fundamental understanding and control over various advanced materials for a spectrum of device and nanotechnology applications ranging from nanoparticle catalysts and magnetic nanoparticles to impedance glucose sensors and next-generation power switches to supramolecular assemblies and interfacial engineering of nanomaterials.



*High Quality Nanoparticles*



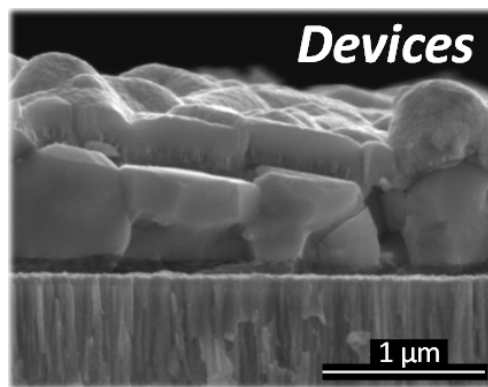
*Pt/CeO<sub>2</sub> Catalysts*



*Smart Capsules-Enabled Functional Coatings*



*Impedance Glucose Sensor*



*2D Chalcogenides*



**Choi**



**Hagelin-Weaver**



**Hages**



**Jain**



**Jang**



**Jiang**



**Orazem**



**Ren**



**Rinaldi**



**Sampath**



**Stoppel**

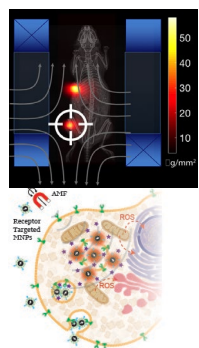


**Ziegler**



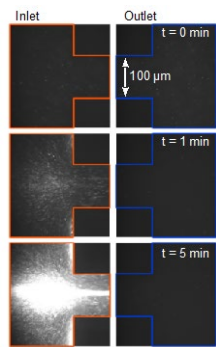
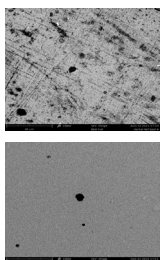
# Biomolecular and Cellular Engineering for Human Health

We perform fundamental research and develop technologies for improving human health. Ongoing research includes studies of nanoparticle-biological interactions, cellular mechanics, engineering of proteases and CRISPR-Cas systems, development of new types of sensors and new materials for biomedical applications.

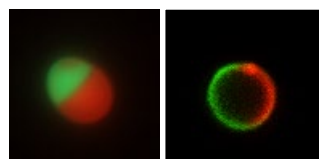


Targeted nanoscale cancer therapy

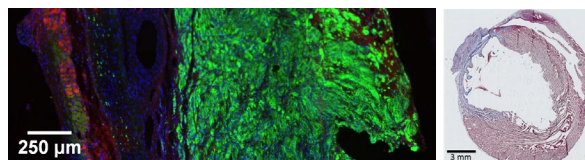
SiC coatings, dental ceramics



Polyelectrolyte trap for DNA separations



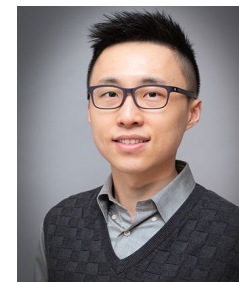
Protein vesicle engineering



Cell – biomaterial interactions



Dickinson



Chu



Denard



Jain



Jang



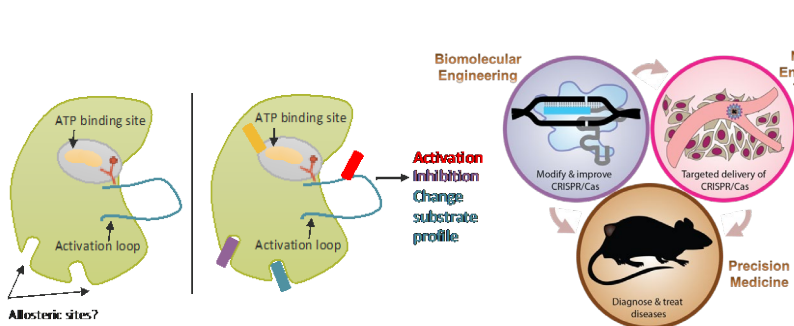
Orazem



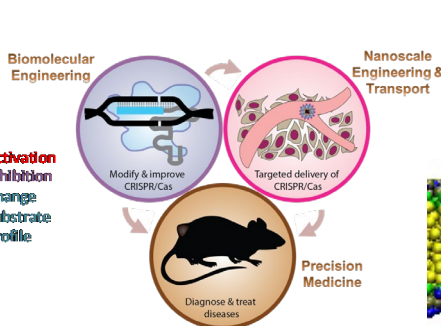
Ren



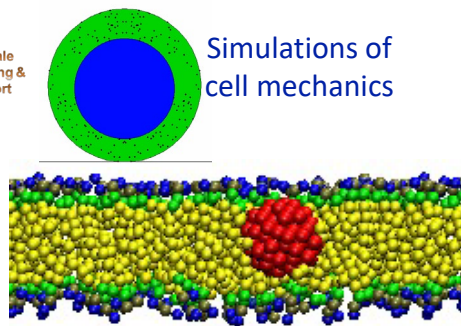
Rinaldi



Enzyme engineering



CRISPR Cas engineering



Modeling of lipid membranes



Sampath



Stoppel



Svoronos

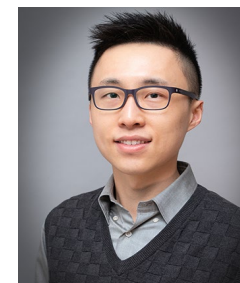


# Complex and Multiphase Flow Dynamics

Insights on the dynamics of complex and multiphase fluids through experiments, theoretical analysis, and simulation are generated. A wide range of industries, products, and emerging technologies are being favorably impacted.



Butler



Chu



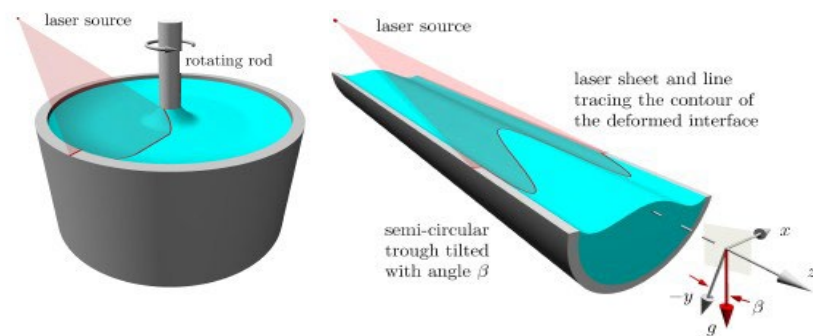
Kopelevich



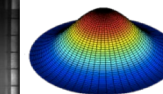
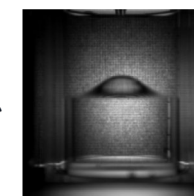
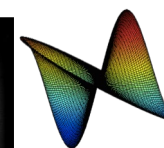
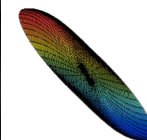
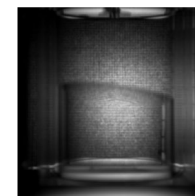
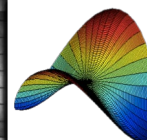
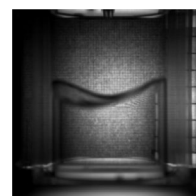
Ladd



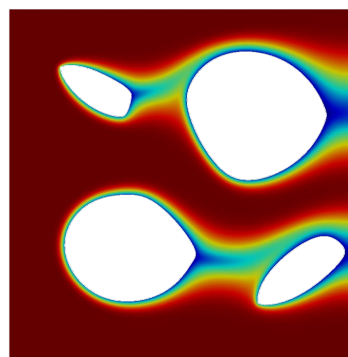
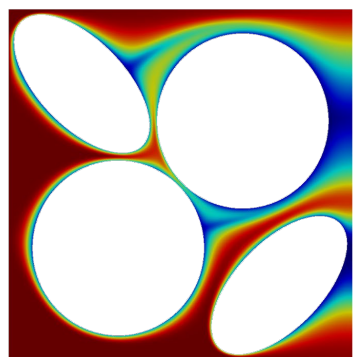
Narayanan



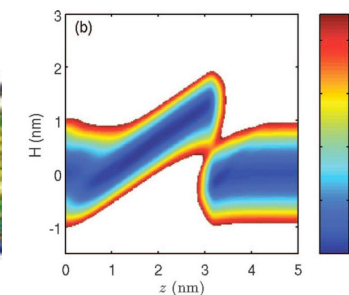
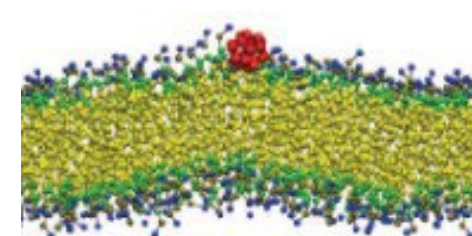
Analysis of the rheology and fluid mechanics of viscous suspensions.



Pattern formation and nonlinear dynamics in interfacial processes.



Concentration field in an evolving pore volume. Increasing concentration is shown from blue to red. Fluid flow is from left to right. The initial pore space (left) is increased by the flow of reactive ions (right)



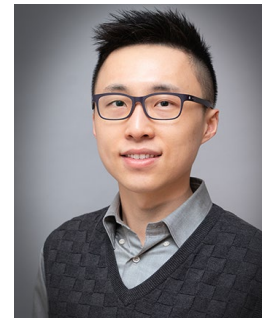
Molecular and multi-scale modeling of soft matter.

# Energy, Environment, and Sustainability

We develop fundamental knowledge and technologies to meet an increased demand for energy with minimal environmental impact. Examples of current focus areas include development of active and selective catalysts, advancing new strategies in membrane-based separations, and introduction of next-generation semiconductors for energy research.



Choi



Chu



Crisalle



Hagelin-Weaver



Hages



Hibbitts



Jiang



Orazem



Moon



Restrepo-Flórez



Sampath



Svoronos



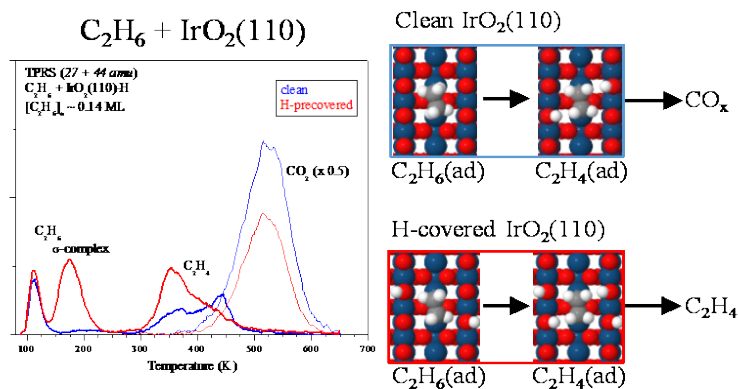
Vasenkov



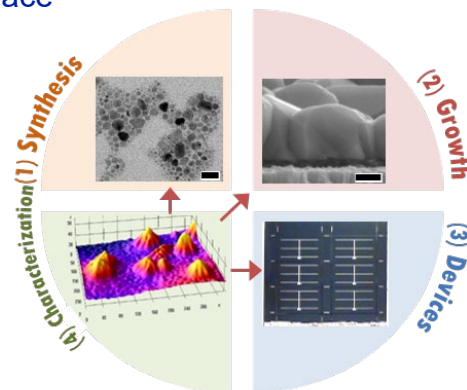
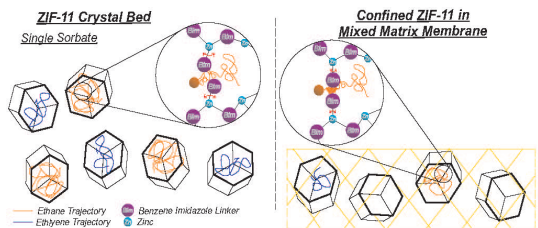
Weaver



Ziegler



Ethane dehydrogenation on the  $\text{IrO}_2(110)$  surface



Holistic energy materials research

Changing gas transport in MOF crystals by confining these crystals in polymers to form hybrid membranes



## Heterogenous Catalysis and Surface Science

Synthesis and Characterization, Kinetic Studies, and Density Functional Theory

**Heterogeneous Catalysts** are key to mitigating climate change, forging a renewable energy and chemicals industry, and providing a high quality of life throughout the globe without sacrificing our environment. At UF, we study catalysis through a combination of synthesis, characterization, and kinetic studies (Hagelin-Weaver and Hibbitts), surface science studies of interfacial chemistry (Weaver), and density functional theory calculations to give insights into atomistic behavior (Hibbitts).



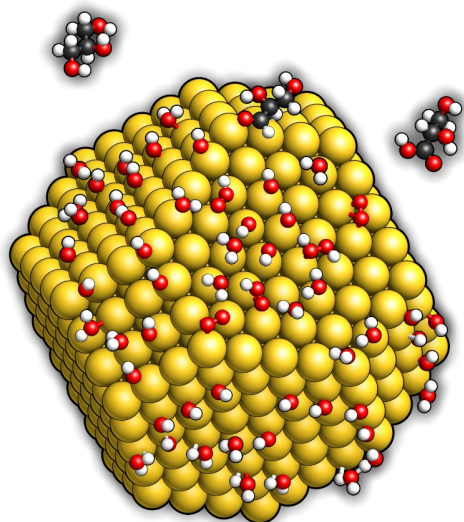
Hagelin-Weaver



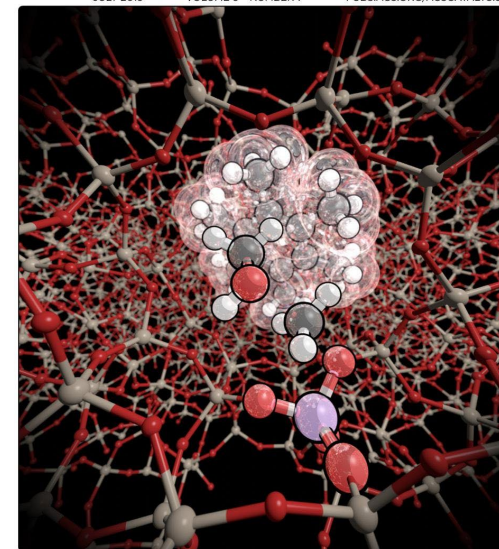
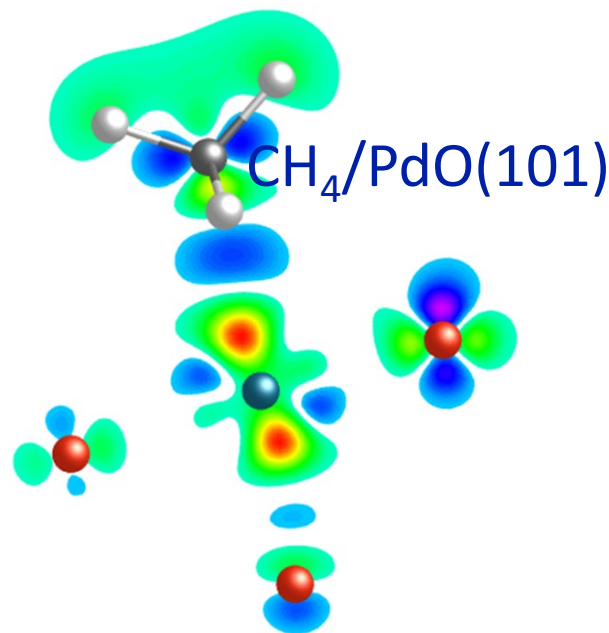
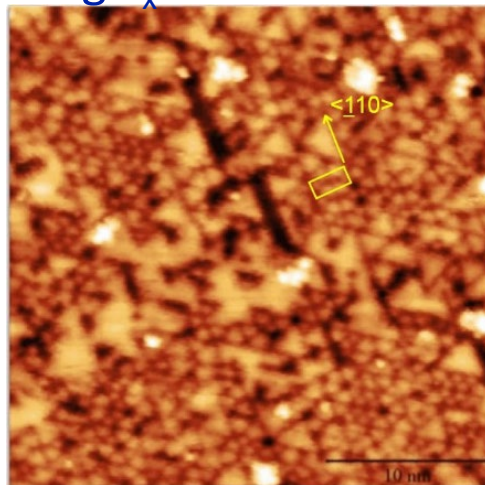
Hibbitts



Weaver

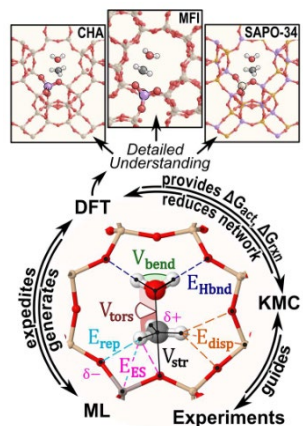


Pd-AgO<sub>x</sub>

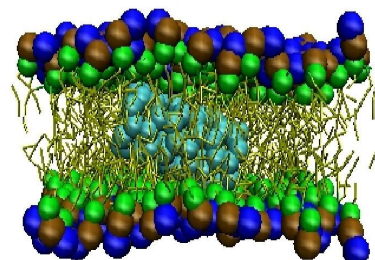


## Modeling, Theory, and Simulation

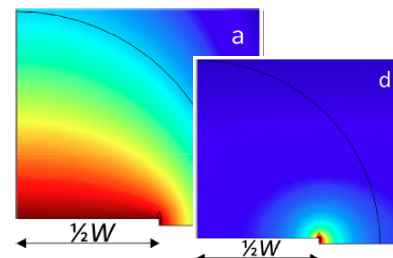
We develop mathematical theories, AI-based algorithms, and computational simulations across the atomistic, particle, and continuum levels to model chemical engineering processes, with the aims of gaining fundamental scientific knowledge and devising next-generation applications in in-space manufacturing, renewable energy, drug delivery, geological formation, electrochemical impedance spectroscopy, and membrane-based separation.



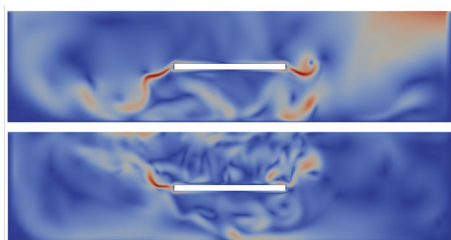
Machine-learning and AI-assisted development of heterogeneous catalysts



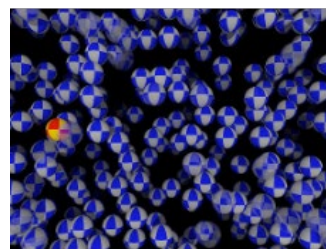
Carbon nanotube embedded in a lipid bilayer



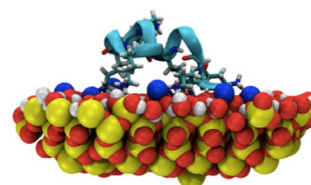
False-color distributions for interdigitated electrodes



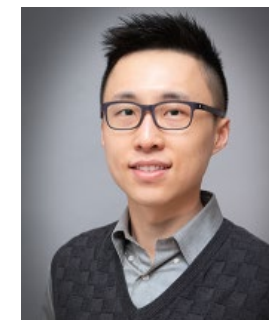
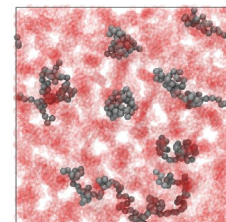
Flow fields around a rotating disk, used for measuring geochemical reaction rates



Particle dynamics theory and simulation of heterogeneous soft matter



Molecular modelling and machine learning of soft materials



Chu



Hibbitts



Kopelevich



Ladd



Narayanan



Orazem



Restrepo-Flórez



Sampath

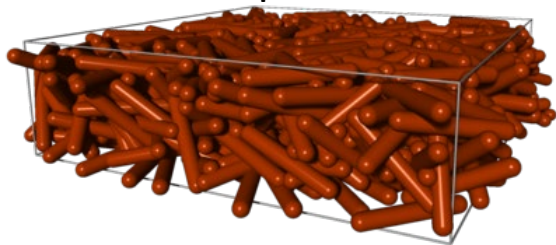


Svoronos

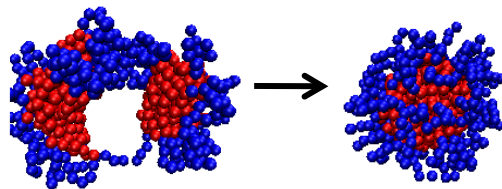


# Transport, Molecular Thermodynamics, and Electrochemical Engineering

We generate insights on the dynamics of complex systems through experiments, theoretical analysis, and simulation. Aims of the research include enabling the efficient control and processing of these systems which are used in a wide range of industries, products, and emerging technologies.



Suspension dynamics and rheology



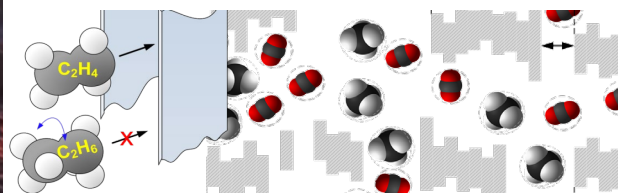
Dynamics of self-assembly



Geochemical instabilities



Instabilities in magma flows



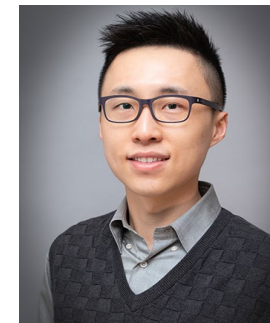
Transport in nanochannels



Butler



Choi



Chu



Hages



Kopelevich



Ladd



Narayanan



Orazem



Rinaldi



Sampath



Vasenkov



# UF CAMPUS LIFE





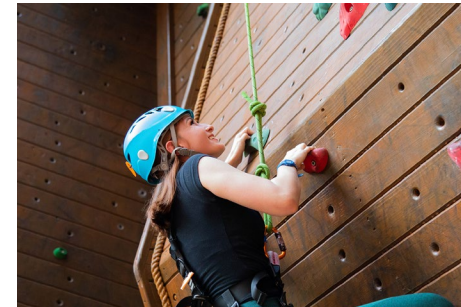
## The Florida Museum



## Curtis M. Phillips Center for Performing Arts



## Lake Wauburg





## Intramural and Club Sports

### Gymnastics



### Rock Climbing



### Surf



### Soccer



### Kick Boxing



### Lacrosse



### Golf





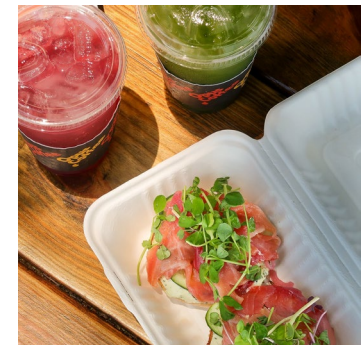
Swamp Head Brewing Company  
High Springs Brewing Company



First Magnitude Brewing Company  
Cypress and Grove Brewing Company



4<sup>th</sup> Ave Food Park





Crescent Beach



Neptune Beach



Amelia Island



Daytona Beach





Ginnie Springs



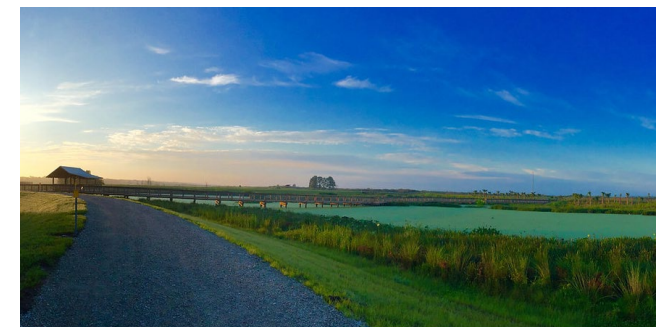
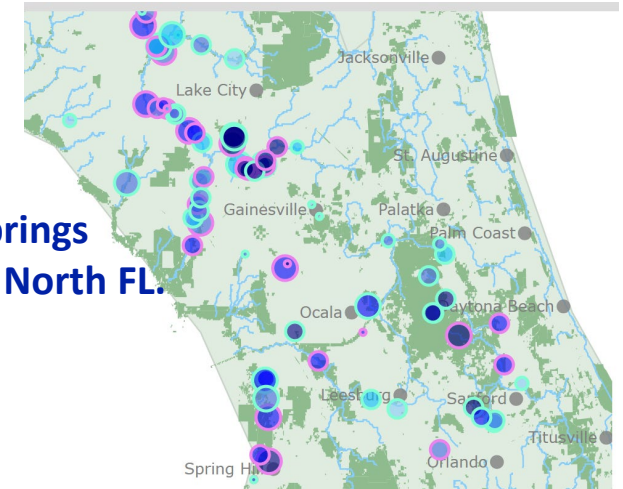
Rainbow Springs State Park



Sweetwater Wetlands



Springs in North FL.





The Hatchetbury



Arcade Bar



Vivid Music Hall

