



Consortium for Innovation in Manufacturing & Materials

# CIMM Workforce Development

## Where are they now?

### Joshua Joffrion



#### Previous CIMM Contributions

Undergraduate Research Assistant in Electrical Engineering and Physics with Dr. Chester Wilson at Louisiana Tech University. Research for CIMM included the synthesis of carbon quantum dots through a variety of methods, the use of microplasmas in water spectroscopy, and selective electroplating.

#### Update

Mr. Joffrion is a *PhD student and Research Fellow in Dr. Chester Wilson's group at Louisiana Tech University.*

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### Pratik KC



#### Previous CIMM Contributions

Graduate Research Assistant with Dr. Arden Moore's group at Louisiana Tech University. Research for CIMM included the design and evaluation of the performance of novel low-profile heat sinks manufactured via 3D printing, microforming, and selective laser melting within a carefully controlled direct immersion cooling environment.

#### Update

Dr. KC graduated with a PhD in Engineering from Louisiana Tech University and is working as a *Thermal Engineer for Applied Technology Associates in the Air Force Research Lab in the Space Vehicle Directorate.*



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## Rami Khoury



### Previous CIMM Contributions

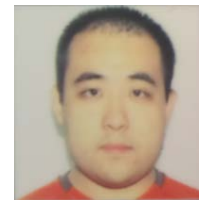
Graduate Research Assistant with Dr. Louis Haber's group at Louisiana State University. Research for CIMM included the construction of a pump-probe reflectivity and time-resolved microscopy optical setup to investigate ultrafast heating and melting dynamics in metal alloy and semiconductor surfaces.

### Update

Dr. Khoury graduated with a PhD in Ultrafast and Nonlinear Spectroscopy of Nanomaterials from Louisiana State University and is working as a **Fiber Laser Engineer for nLIGHT**.

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## Zilong Li



### Previous CIMM Contributions

Graduate Student with Dr. Thomas Bishop's group at Louisiana Tech University. Li helped to develop a workflow for CIMM researchers to share work or data between remote sites. For example, his team conducted a performance analysis and demonstrated how to run a simulation on LONI and share results via Google Drive within the hub framework without changing operating systems.

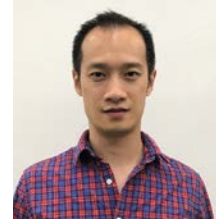
### Update

Dr. Li graduated with a PhD in Computational Analysis and Modeling from Louisiana Tech University. The title of Dr. Li's thesis is [A Framework of Multi-Dimensional and Multi-Scale Modeling with Applications](#). He is currently a **post-doc at NYU with Professor Tamar Schlick in the Departments of Chemistry and Mathematics**.



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## Yang Mu



### Previous CIMM Contributions

Research Assistant and Professor of Mechanical Engineering at Louisiana State University. Mu helped design and build ultra-high vacuum systems to deposit metal/ceramic thin films, and carry out characterization on thin films prepared. A method of in-situ and ex-situ mechanical testing on thin film interfacial region was developed to test its integrity.

### Update

Dr. Mu is currently employed by the **Louisiana State University Shared Instrumentation Facilities (SIF), a part of the CIMM Core User Facilities (CUF), as a PhD technical staff member.**

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## Chinedu Okafor



### Previous CIMM Contributions

Graduate Research Assistant at Louisiana Tech University in Dr. Adarsh Radadia's group. Okafor helped to design and evaluate the performance of plastic FDM fabricated gas chromatograph columns with the aim of establishing the suitability of such columns for chemical analysis.

### Update

Mr. Okafor graduated with a Masters in Chemical Engineering from Louisiana Tech University and is currently a **Plant Manager for Linde in Salt Lake City, Utah.**



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## Nabamita Pal

### Previous CIMM Contributions

Postdoc Researcher at Louisiana Tech University in Dr. Chester Wilson's group. Pal researched perovskite solar cells and helped to develop a new nanostructured carbon composite that adheres at the nano scale.



### Update

Dr. Pal graduated with a PhD in Micro and Nano Systems Engineering from Louisiana Tech University and is currently a **Lecturer at Louisiana Tech University**.

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## Jawala Parajuli

### Previous CIMM Contributions

Graduate Research Assistant at Louisiana Tech University in Dr. Daniela Mainardi's group. Parajuli helped perform Molecular Dynamics simulations and analysis to study segregation of bimetallic systems during solidification.



### Update

Ms. Parajuli graduated with a Masters Degree in Quantum Chemistry/Molecular Science/Nanotechnology from Louisiana Tech University, and is currently an **Integration & Yield Engineer for Global Foundries in New York**.



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## Jeewan Ranasinghe

### Previous CIMM Contributions

Graduate Research Assistant at Louisiana State University in Dr. Louis Haber's group. Ranasinghe's research focused on laser heating and melting dynamics of metal, metal alloy, and semiconductor surfaces, as well as preparing silicon, iron, and aluminum nanoparticles to investigate their ultrafast laser melting dynamics.



### Update

Dr. Ranasinghe graduated with a PhD in Physical Chemistry from Louisiana State University and is currently a **postdoctoral research scientist at UC Santa Barbara**.

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## Shuai Shao

### Previous CIMM Contributions

Assistant Professor of Mechanical Engineering at Louisiana State University. Shao's research focused on the multiscale interface engineering of metal/ceramic material systems.



### Update

Dr. Shao is currently **Associate Professor of Mechanical Engineering at Auburn University** and researcher for the National Center for Additive Manufacturing Excellence in the Multiscale Interface Engineering Research Group.



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## RajKumar Vinnakota

### Previous CIMM Contributions

Graduate Research Assistant at Louisiana Tech University in Dr. Dentcho Genov's group. Vinnakota helped to develop a comprehensive self-consistent thermo-optical model of the laser-matter interactions pertaining to Selective Laser Melting (SLM) of metal powder beds in order to optimize the SLM process, increase energy efficiency and print rates and minimize structural defects in the 3D printed metal parts.



### Update

Dr. Vinnakota graduated with a PhD in Engineering from Louisiana Tech University and is currently an ***Assistant Professor of Engineering at Troy University in Alabama.***



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# **CIMM Graduate Students And Post-doctoral Researchers**



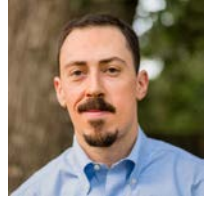
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## G. Neal Blackman III

Graduate Research Assistant  
PhD in Engineering Physics  
Louisiana Tech University

## Contact

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## Specialization

Optics, Photonics, Computational quantum optics.  
Faculty Advisor: Dentcho A. Genov

## Research

We perform classical and quantum-mechanical studies of the interaction of electromagnetic radiation with metallic nanoparticles and composites. Using custom-written software, partially developed with the support provided by CIMM, we analyze how quantum size effects influence the electromagnetic properties of nanosized objects and specifically their effective permittivity and permeability. The results are used to investigate how quantum confinement can be used to enhance and tune the electrical and magnetic response of nanocomposite materials, with possible application is Selective Laser Melting (SLM) processes.

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## Fraser Daniel

Graduate Research Assistant  
PhD in Micro & Nanoscale Engineering  
Louisiana Tech University

## Contact

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## Specialization

Fabrication of sensor and actuator using fused deposition modeling (FDM); Simulating 3D printing process for predicting fabricated part performance.  
Faculty Advisor: Dr. Adarsh Radadia

## Research

We conduct research on using conductive filaments with fused deposition modeling to fabricate sensors and actuators (completely 3D printed) for real life applications like a flowmeter to measure the flow of gas through a narrow channel and an electric tweezer to grip material. In addition, we also work on methods to predicting mechanical and electrical properties of parts formed via fused deposition modeling. This reduces the time and cost associated with expensive trial and error experimentation for optimizing part performance.





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## **Shayan Davani**

Postdoctoral Fellow  
PhD in Engineering  
Louisiana Tech University

## **Contact**

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## **Specialization**

Heat transfer, thermal management, microfluidics.  
Faculty Advisor: Arden L. Moore

## **Research**

We conduct two-phase cooling experiments on using micro-finned and nanostructured surfaces for direct immersion cooling in dielectric liquids. We rely on surfaces manufactured by advanced and high throughput techniques such as “microscale roll molding” and “laser additive manufacturing”. High speed visualization and image processing are used in our studies to investigate the pivotal role of bubble dynamics in this passive heat transfer scheme.

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## **Nisha Dhariwal**

Graduate Research Assistant  
PhD in Molecular Science &  
Nanotechnology  
Louisiana Tech University

## **Contact**

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## **Specialization**

Computational materials science; Interatomic potential development; Molecular Dynamics (MD) simulations of materials and interfaces.  
Faculty Advisor: Collin D. Wick, B. Ramu Ramachandran

## **Research**

We develop Modified Embedded Atom Method (MEAM) interatomic potentials for transition metals and metal/ceramic systems. Various physical properties are calculated using these potentials and compared with the first principles density functional theory (DFT) and/or experiments. These are further utilized to conduct MD simulations for investigating the mechanism of interfacial failure under shear deformation.



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## Asela Dikkumbura

Graduate Research Assistant  
PhD Candidate in Chemistry  
Louisiana State University

## Contact

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## Specialization

Synthesis and characterization of nanomaterials, transient absorption spectroscopy, second-harmonic generation, pump-probe reflectivity.

Faculty Advisor: Dr. Louis H. Haber

## Research

Our project with CIMM is focused on laser heating and melting dynamics of metal, metal alloy, and semiconductor surfaces. We are also preparing silicon, iron, and aluminum nanoparticles to investigate their ultrafast laser melting dynamics.

## Huan Ding

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering  
Louisiana State University

## Contact

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## Specialization

Novel metal/alloy materials fabricated by Selective Laser Melting (SLM); Metal/alloy Powder Metallurgy; Materials Testing.

Faculty Advisor: Shengmin Guo

## Research

We design alloy and evaluate the sample's microstructure and mechanical property which was manufactured via 3D printing (such as Selective Laser Melting and Fused Deposition Modeling). We also calculate phase diagram and thermodynamics behavior during the sintering and solidification process with Thermodynamic calculation software.



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## Hamed Ghadimi

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering  
Louisiana State University

## Contact

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## Specialization

Fatigue life studies of different alloys. Additive Manufacturing method development;  
Mechanical properties of AM parts.

Faculty Advisor: Dr. Shengmin Guo

## Research

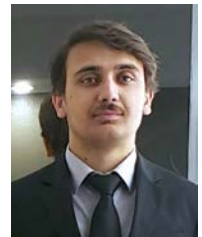
We are researching about the fatigue life of specimens, which are fabricated by additive manufacturing methods, using various testing tools & technics. Also, we are looking into the AM parts characteristics/mechanical properties during manufacturing (e.g. sintering) process and/or after experiencing various construction methods/conditions.

## Prakash Hamal

Graduate Research Assistant  
PhD Candidate in Chemistry  
Louisiana State University

## Contact

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phamal1@lsu.edu



## Specialization

Experimental physical chemistry: ultrafast nonlinear spectroscopy, nanoparticles

Faculty Advisor: Dr. Louis H. Haber

## Research

Our research group has constructed a pump-probe reflectivity and time-resolved microscopy optical setup to investigate ultrafast heating and melting dynamics in metal alloy and semiconductor surfaces.



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## Ali Hemmasian Etefagh

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering  
Louisiana State University

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## Specialization

Corrosion behavior of different alloys in diverse environments and evaluate it by the means of electrochemical methods

Faculty Advisor: Dr. Shengmin Guo

## Research

Evaluation the corrosion behavior of 3D printed parts from stainless steel and titanium in sea water environment and play with the production and post production parameters to gain the best results.

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## Madhavi Kumara

Graduate Research Assistant  
PhD in Molecular science and  
nanotechnology  
Louisiana Tech University

## Contact

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## Specialization

Material science; Nano and microparticle synthesis and MEMS/NEMS device fabrication

Faculty Advisor: Dr Chester Wilson

## Research

We investigate ways to synthesize magnetic nanoparticles for additive manufacturing. These nanoparticles are utilized to manufacture strong permanent magnets using selective laser synthesis. These nanoparticles are also used to fabricate thin film electrical devices.



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## Frank A. McKay

Graduate Research Assistant  
PhD in Engineering Physics & Astronomy  
Louisiana State University

## Contact

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## Specialization

Elucidation of structural, electronic, and chemical properties of metal alloys.  
Faculty Advisor: Phillip Sprunger

## Research

We synthesize and characterize the surface and bulk electronic, chemical, and structural properties of high entropy alloys. This includes employing a number of synchrotron-based VUV/x-ray spectroscopies, as well as elevated temperature scattering probes.

## Abu Shama Mohammad Miraz

Graduate Research Assistant  
PhD in Engineering  
Louisiana Tech University

## Contact

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shamamiraz17@gmail.com



## Specialization

Computational materials science; multiscale simulations of materials and interfaces  
Faculty Advisor: Collin D. Wick, B. Ramu Ramachandran

## Research

We develop inter-atomic potential models, learned using genetic algorithm, for metal/ceramic interfaces and perform multi-scale atomistic calculations to study their mechanical behavior. In addition, we carry out predictive simulations of doping the metal/ceramic interfaces aimed at enhancing their overall strength.



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## Reza Namakian

Graduate Research Assistant  
Ph.D. in Mechanical Engineering  
Louisiana State University

## Contact

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rnamak1@lsu.edu



## Specialization

Computational Mechanics, Computational Material Science, Fracture Mechanics, Plasticity in Metals, Lightweight Metals, Multi-scale Interface Engineering.  
Faculty Advisors: Dr. Dorel Moldovan and Dr. Wen J. Meng

## Research

My field of study is multiscale computational material science with focus on solid interfaces. In our research, using numerical simulations at various length scales, we address the structure-property correlations in materials with high density of interfaces. By using numerical simulations such as: density functional theory, molecular dynamics, dislocation dynamics, and finite element method, our main focus is on the development of fundamental understanding of the correlation between the structure of solid interfaces and the resulting mechanical properties.

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## Brian Novak

Research Associate  
Mechanical and Industrial Engineering  
Louisiana State University

## Contact

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## Specialization

Molecular Simulation  
Faculty Advisor: Dr. Dorel Moldovan

## Research

We perform classical molecular simulations of metal and alloy bulk and interfacial properties, develop new interatomic potentials, and study the interfacial processes of solidification and deposition using simulations.



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## Tailei Qi

Graduate Research Assistant  
PhD Candidate in Engineering  
Louisiana State University

## Contact

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## Specialization

Experimentation on low pressure high density plasma assisted vapor phase deposition of engineering coatings and associated materials characterization and mechanical/chemical testing.

Faculty Advisor: Wen Jin Meng

## Research

We designed and built an inductively coupled plasma (ICP) assisted vapor phase deposition system with the aim of synthesizing carbon-containing coatings for various applications, including diamond-like carbon (DLC) coatings.

## M Shafiqur Rahman

PhD Candidate and Graduate  
Research Assistant  
Department of Mechanical Engineering  
The University of New Orleans

## Contact

504-435-7269  
mrahman3@uno.edu



## Specialization

Additive Manufacturing, Solid Mechanics, and Computational Fluid Dynamics

Faculty Advisor: Dr. Uttam K. Chakravarty

## Research

Mr. Rahman is focused on the thermo-fluid characterizations of Ti-6Al-4V melt-pool in Powder-Bed Fusion Additive Manufacturing processes using laser and electron beam. The research includes developing experimentally-validated multiphysics numerical models to investigate the effects of process parameters on the temperature distribution, melt-pool dynamics, melt-pool geometry, and heating and cooling rates in the PBF processes. The research involves the concepts of computational fluid dynamics, heat transfer, powder metallurgy, and advanced numerical analysis. He also has a strong background in solid mechanics and energy harvesting systems.



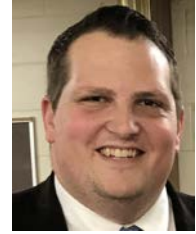
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## **Bryant Redford**

Graduate Research Assistant  
PhD Student  
Molecular Science and Nanotechnology  
Louisiana Tech University

## **Contact**

870-944-0780  
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## **Specialization**

Creation of metal and alloyed metal powders using electrochemical methods suitable for 3D printing. Improving material attributes of 3D printable plastic using nanocomposites.

Faculty Advisor: Dr. Chester Wilson

## **Research**

Develop a Samarium Cobalt powder that would be suitable for 3D printing. Currently there are no permanent magnets that are available for 3D printing and SmCo was chosen due to it having better properties than neodymium magnets.

## **Alexa Robinson**

Graduate Research Assistant  
PhD in Molecular Science and  
Nanotechnology  
Louisiana Tech University

## **Contact**

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amr069@latech.edu



## **Specialization**

Computational materials science; first principles simulations of materials and interfaces  
Faculty Advisor: Pedro Derosa

## **Research**

Our current research utilizes Density Functional Theory (DFT) and Molecular Dynamics (MD) to simulate and analyze oxidation mechanisms of High Entropy Alloys (HEAs). A better understanding of these mechanisms may facilitate finding a solution to slow oxidation.





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## Siavash Sarrafan

Graduate Student

PhD

Louisiana State University

## Contact

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## Specialization

Engineering mechanics; Experimental mechanics; Dislocation dynamics.

Faculty Advisor: Dr. Guoqiang Li

## Research

Ongoing research, supported by CIMM, is on interfacial fracture of 3D printed structures using selective laser melting (SLM). It mainly focuses on the interfacial fracture under Mode I, Mode II, and mixed Mode loading and numerical modeling of fracture of SLM printed tensile specimen. Analytical modeling of the interfacial fracture of 3D printed metallic specimens, which have periodic zigzag fracture path, is being developed.

## Cynthiya Shrestha

Mechanical Engineering

Undergraduate

University of New Orleans

## Contact

504-481-6734

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## Specialization

Nanoparticle infused Additive Manufacturing

Faculty Advisor: Dr. Damon Allen Smith

## Research

This research project primarily focuses on three major aspects: synthesis and inclusion of metallic nanoparticles within a polymer matrix, extrusion of composite filaments and three-dimensional (3D) printing of multifunctional polymer composites. Specifically, we are interested in synthesizing silver nanoparticles because of their enhanced antimicrobial, mechanical and optical properties. Silver reinforced 3D printed polymer specimen can have applications in varied fields like bio-mechanics, electronics, and additive manufacturing technology.



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## Yooseob Song

Graduate Research Assistant  
PhD Candidate in Civil Engineering  
Louisiana State University

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## Specialization

Development of thermo-mechanical coupled strain gradient plasticity model based on computational solid mechanics in small-scale structures.

Faculty Advisor: George Z. Voyiadjis

## Research

We investigate an in-depth analysis on the micro-reverse extrusion processes in terms of the size effect phenomena and the physics behind the changes of diameter of the punch, loading rates, mesh densities and material strengthening behavior using the finite element analysis based on the finite deformation theory.

## Tyler Sonsalla

Graduate Research Assistant  
Ph.D. candidate in Molecular Sciences  
and Nanotechnology  
Louisiana Tech University

## Contact

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## Specialization

FDM-printed heat sinks and heat exchangers; FDM filament fabrication; Perovskite solar cells; Plasmonically enhanced amorphous silicon solar cells.

Faculty Advisor: Leland Weiss

## Research

Our CIMM-related research aims to fabricate FDM-printed heat sinks and heat exchangers for waste heat applications with polymer and composite filaments. Additionally, we are working to characterize FDM-printed perovskite-polymer filaments for solar cell applications. Furthermore, integration of perovskite-polymer based solar cells onto FDM-printed heat sinks are underway.



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## Ran Sun

PhD Candidate  
Engineering Physics  
Louisiana Tech University

## Contact

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## Specialization

Molecular dynamics simulations and modeling. Data analysis and work-flow development.

Faculty Advisor: Thomas C. Bishop

## Research

I'm working on developing and managing CIMMHub as a platform for CIMM investigators to share research efforts. A data management solution has been developed that integrates Google Drive with CIMMHub such that people can synchronize and manage sharing of their data between local workstations, any HPC resource, experimental equipment and the Hub.

## Alexander Ulrich

Research Fellow  
Louisiana Tech University

## Contact

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aju002@latech.edu



## Specialization

Materials science; electrochemistry; chemistry.

Faculty Advisor: Chester Wilson

## Research

My research, supported by CIMM, aims to exploit electrochemical methods to produce metal micro-powders that can be used as the feedstock in 3D printers that employ Selective Laser Melting or SLM. The methods being developed help address the need for a way to manufacture precise alloyed powder that increases the strength of final printed products and increase the market uses of SLM through wider metal feedstock options.



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## Mohammadreza Yaghoobi

Graduate Research Assistant  
PhD Candidate in Civil Engineering  
Louisiana State University

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## Specialization

Multiscale modeling of microfabrication processes and advance engineering materials.  
Faculty Advisor: George Z. Voyiadjis

## Research

My research focuses on atomistic simulation and nonlocal continuum modelling of intrinsic and extrinsic materials' size effects relevant to sub-mm to micron scale forming and replication. The size effects in metallic samples of confined volumes are addressed during the nanoindentation and micropillar compression experiments.

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## Hong Yao

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering, Department of  
Mechanical and Industrial  
Engineering, Louisiana State University

## Contact

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## Specialization

Impacts of laser parameters for different materials, Selective Laser Melting Process,  
Microstructure study on defects of 3D printed parts.  
Faculty Advisor: Dr. Shengmin Guo

## Research

Print samples using different metal powders, manipulate laser parameters for specific material, study the microstructure before and after tensile/fatigue tests.



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## Huali Ye

Graduate Research Assistant  
Computational Analysis and Modeling  
Louisiana Tech University

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## Specialization

Computational fluid dynamics; Numerical heat transfer; Computational mathematics  
Faculty Advisor: Dr. Don Liu

## Research

Our project supported by CIMM is about the simulation of laser-heating induced latent heat input and sensible heat transfer between melt, mushy and solid metal materials with numerical method. It involves phase change and heat transfer. The challenges we met include predicting and tracking the moving liquid\_ solid interfaces and reconstructing interfacial surfaces. In the meantime, we used parallel C++ codes to improve the performance of this simulation.

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## Congyuan Zeng

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering  
Louisiana State University

## Contact

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## Specialization

Novel metal/alloy materials fabricated by selective laser melting (SLM).  
Faculty Advisor: Shengmin Guo

## Research

Making metal powders for SLM. Thermoelectric materials, porous materials fabricated by SLM and property characterization of them. Phase evolution of spherical powders during rapid cooling process after laser melting.



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## **Bin Zhang**

Postdoc research associate  
Louisiana State University

## **Contact**

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## **Specialization**

Microscale metal forming and plasticity experimentation; X-ray and electron beam materials characterization, including focused ion beam (FIB), electron backscatter diffraction (EBSD), and transmission electron microscopy (TEM).

Faculty Advisor: Wen Jin Meng

## **Research**

We conduct experiments focused on micro/meso scale metal forming, nano/micro scale materials characterization, and micro/meso scale mechanical testing, with application to fabrication of micro/meso scale metal-based structures.

## **Boliang Zhang**

Graduate Research Assistant  
PhD Candidate in Mechanical  
Engineering  
Louisiana State University

## **Contact**

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bzhan13@lsu.edu



## **Specialization**

High entropy alloy design, CALPHAD calculation.

Faculty Advisor: Dr. Shengmin Guo

## **Research**

We calculate phase change behavior of arc melted/3D printing alloy during the solidification process with Computer Coupling of Phase Diagrams and Thermochemistry (CALPHAD) method to design new high entropy alloys. We also evaluate aqueous corrosion by thermodynamic calculated Pourbaix diagrams and experimental Cyclic Polarization test on High Entropy Alloy.



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## **Xiaoman Zhang**

Graduate Research Assistant  
PhD Candidate in Engineering  
Louisiana State University

## **Contact**

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## **Specialization**

Experimentation on micro scale plasticity and mechanical integrity of metal/ceramic interfaces; high/ultra-high vacuum vapor phase deposition and thin film crystal growth; materials characterization by X-ray and electron beam methods.

Faculty Advisor: Wen Jin Meng

## **Research**

We measure mechanical failure of ceramic/metal interfaces under shear, compression, and tension loading through in-situ microscale mechanical testing with concurrent electron microscopy observations; we grow heteroepitaxial thin film crystals and study mechanical response of such interfaces.

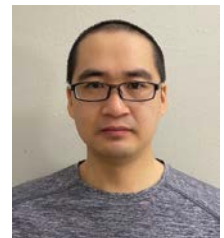
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## **Jikui Zhao**

Graduate Research Assistant  
PhD Candidate in Engineering  
Louisiana State University

## **Contact**

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Jzhao23@lsu.edu



## **Specialization**

Experimentation on small scale metal forming and associated materials characterization and mechanical testing.

Faculty Advisor: Wen Jin Meng

## **Research**

We are conducting microscale metal extrusion experiments in an attempt to elucidate various kinds of mechanical size effects encountered in large strain small scale plastic deformation of materials.