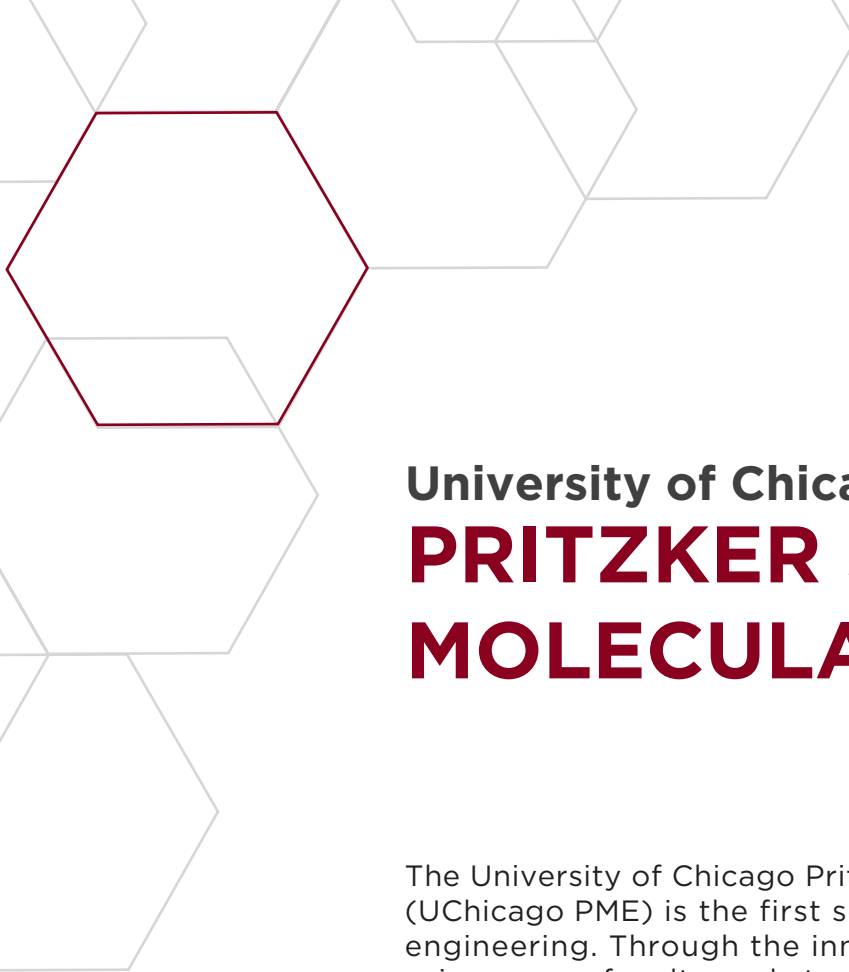




University of Chicago **PRITZKER SCHOOL OF MOLECULAR ENGINEERING**

Faculty Guide 2026–2027

The University of Chicago Pritzker School of Molecular Engineering (UChicago PME) is the first school in the nation dedicated to molecular engineering. Through the innovative application of molecular-level science, our faculty and students are pioneering novel solutions to critical global challenges.

UChicago PME's work is organized into interdisciplinary, problem-solving institutes focused on innovation, including quantum engineering, materials for sustainability, and immunoengineering—driving solutions for real-world problems such as unhackable communications, clean energy and water, and better health. UChicago PME also explores the intersection of science and art to promote public understanding and to cultivate collaboration between both fields. Our uniquely close relationship with Argonne National Laboratory also engenders world-class opportunities.

We also are home to a number of cross-cutting Centers and Initiatives, including the Berggren Center for Quantum Biology and Medicine, the Chicago Immunoengineering Innovation Center, and STAGE Center, which focuses on merging scientific and artistic inquiry, often through the creation of new film, theatre, games, and other artistic endeavors inspired by science and technology.

Fundamentally collaborative, UChicago PME and our network of global partners are empowering consequential, real-world discoveries to engineer a better future.

Visit pme.uchicago.edu to learn more.



Quantum Science and Engineering



David Awschalom

Director of the Chicago Quantum Institute; Liew Family Professor of Molecular Engineering; Senior Scientist, Argonne National Laboratory; Founding Director, Chicago Quantum Exchange

Institutes: Chicago Quantum Institute

Research areas: Quantum Spintronics, Quantum Sensing, Quantum Communication, Quantum Computing, Quantum Materials, Semiconductor and Molecular Qubits

Awschalom works in the fields of spintronics and quantum information engineering, where he develops new methods to explore the behavior of individual electrons, nuclei, and photons in semiconductors and molecules. His research includes implementations of information processing with applications in quantum computing, communication, and sensing. He has received numerous awards, including the American Physical Society Oliver Buckley Prize, Julius Edgar Lilienfeld Prize, and the Materials Research Society David Turnbull Lectureship.



Andrew Cleland

John A. MacLean Sr. Professor of Molecular Engineering Innovation and Enterprise; Director, Pritzker Nanofabrication Facility

Institutes: Chicago Quantum Institute

Research areas: Quantum Computing, Quantum Communication, Quantum Sensing

Cleland specializes in quantum information, with research efforts in quantum computing, quantum communication, and hybrid quantum systems. His research focuses on exploiting properties of quantum mechanical systems that cannot be duplicated in classical (non-quantum) systems, including the use of quantum entanglement and the superposition of quantum states. He is a fellow of the American Association for the Advancement of Science and the American Physical Society.



Aashish Clerk

Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Theoretical Quantum Condensed Matter Physics, Quantum Optics, Engineered Quantum Systems, Quantum Information

Clerk focuses on understanding complex phenomena in quantum systems that are both strongly driven and subject to dissipation. Such effects can enable quantum technologies to transcend the limitations of purely classical systems. He was appointed a Simons Investigator in Theoretical Physics in 2020, and received a Sloan Research Fellowship and an E.W.R. Steacie Memorial Fellowship from Canada's National Sciences and Engineering Research Council.



Jacob Covey

Associate Professor of Molecular Engineering, UChicago PME and the Department of Physics

Institutes: Chicago Quantum Institute

Research areas: Atomic Physics, Optical Physics, Molecular Physics, Fundamental Physics, Metrology, Device Engineering

Covey specializes in atomic, molecular, and optical physics. As a quantum experimentalist, he focuses on arrays of neutral atoms in optical tweezers—one of the most scalable and promising technologies for quantum computers. Beyond quantum computing, his work spans fundamental physics, metrology, and device engineering.



Quantum Science and Engineering



Greg Engel

Professor, UChicago PME, Department of Chemistry, James Franck Institute, and the College; Co-Director of the Berggren Center for Quantum Biology and Medicine

Institutes: Materials and Sustainability, Chicago Quantum Institute

Research areas: Excited State Dynamics, Quantum Sensing, Quantum Coherence, Spectroscopy, Biophysics

Engel's research focuses on new strategies to observe, measure, and control excited state reactivity and quantum dynamics. Using spectrometers of his own design, he explores bio-inspired design principles for steering excitonic transport, open quantum dynamics, and photochemical reaction dynamics.



Laura Gagliardi

Richard and Kathy Leventhal Professor, UChicago PME, Department of Chemistry, James Franck Institute, and the College; Director, Catalyst Design for Decarbonization Center

Institutes: Chicago Quantum Institute, Materials and Sustainability

Research areas: Quantum Chemical Methods Development, Catalysis, Spectroscopy, Photochemistry, Gas Separation, Actinides, Quantum Materials

Gagliardi develops novel wave-function-based quantum chemical methods and applies them to study problems related to renewable energies. She combines multireference theories with density functional theory. She develops force-fields from first principles to be used in classical simulations. She employs these methods to explore molecular systems and materials relevant to catalysis, carbon dioxide separations, photochemical processes, spectroscopy, and heavy-element chemistry. Among other awards, she has received the Faraday Lectureship Prize of the Royal Society of Chemistry in 2021 and the Peter Debye Award in Physical Chemistry of the American Chemical Society in 2020.



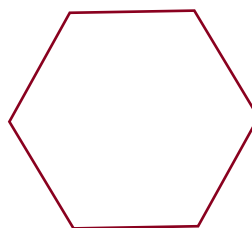
Giulia Galli

Liew Family Professor, UChicago PME, Department of Chemistry, and the College; Senior Scientist, Argonne National Laboratory; Director, Midwest Integrated Center for Computational Materials (MICCoM)

Institutes: Materials and Sustainability, Chicago Quantum Institute

Research areas: Theoretical and Computational Modeling of Materials for Renewable Energy Sources and Quantum Information Technologies

Galli develops theoretical and computational methods to predict and engineer material and molecular properties from first principles. She focuses on problems relevant to the development of sustainable energy sources and quantum technologies. She has received numerous awards, including the Materials Research Society Materials Theory Award, American Physical Society David Adler Lectureship Award in Materials Physics and Rahman Prize for Computational Physics, Feynman Prize in Nanotechnology (Theory), the Medal of the Schola Physica Romana, and the Tomassoni-Chisesi Prize. She is a member of the National Academy of Sciences, American Academy of Arts and Sciences, and International Academy of Quantum Molecular Science, and a fellow of the American Association for the Advancement of Science and the American Physical Society.



Quantum Science and Engineering



Alex High

Associate Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Quantum Materials, Heterogeneous Integration and Hybrid Quantum Technologies, Quantum Sensing, Quantum Photonics, Quantum Optomechanics

High studies optical and quantum science in solid-state systems. He explores new physics and applications that emerge when optical systems are controlled at a nanoscale level. He is developing optical quantum circuits and realizing new technologies based on engineered light/matter interactions.



Liang Jiang

Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Quantum Communication, Quantum Computing, Quantum Sensing, Quantum Simulation, Quantum Control, Quantum Machine Learning, Quantum Error Correction

Jiang theoretically investigates quantum systems and explores various quantum applications, such as quantum sensing, quantum transduction, quantum communication, and quantum computation. His research focuses on using quantum control and error correction to protect quantum information from decoherence to realize robust quantum information processing. He has worked on modular quantum computation, global-scale quantum networks, room-temperature nano-magnetometer, sub-wavelength imaging, micro-optical quantum transduction, and error-correction-assisted quantum sensing and simulation.



Nadya Mason

Vice President for Research; Robert J. Zimmer Professor of Molecular Engineering and Physics

Institutes: Chicago Quantum Institute

Research areas: Quantum Materials, Electronic Transport in Nanostructures, Superconductivity

Nadya Mason specializes in experimental studies of quantum materials, with a research focus on the electronic properties of nanoscale and correlated systems, such as nano-scale wires, atomically thin membranes, and nanostructured superconductors. Her research is relevant to applications involving nanoscale and quantum computing elements.



Peter Maurer

Associate Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Quantum Optics, Quantum Sensing, Solid-State Spin Systems, Single-Molecule Biophysics, Physical Chemistry

Maurer focuses on the development and application of novel imaging and sensing modalities that enable the investigation of biological systems that are not accessible by conventional techniques. He explores coherent control techniques and quantum algorithms that harness solid state spin systems of increasing complexity, and combines them with state-of-the-art biophysics tools. Such novel technologies include the development of a nanoscale quantum sensor for NMR spectroscopy of individual biomolecules, a single-molecule platform for quantum sensing, and the establishment of new nanophotonics techniques for bio-imaging. Maurer was named a 2026 Sloan Research Fellow and is a recipient of the NSF CAREER Award. His work on encoding a spin qubit in a fluorescent protein was named by IOP's Physics World as one of the top 10 breakthroughs of 2025.

Quantum Science and Engineering



Jiwoong Park

James Franck Professor, Department of Chemistry, UChicago PME, James Franck Institute, and the College

Institutes: Chicago Quantum Institute

Research areas: Nanoscale Materials, Chemical Physics

Park's research focuses on the science and technology of atomically thin solids. Using these materials, including electrically conducting graphene, insulating hBN, and semiconducting transition metal dichalcogenides, his research group builds advanced quantum materials and atomically thin integrated circuitry by combining advanced growth, characterization, and device fabrication methods.



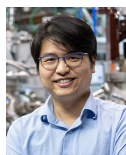
Ruben Verresen

Assistant Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Condensed Matter Physics, Quantum Information, Topological Physics, Quantum Simulation, Engineered Quantum Systems

Verresen explores the theory of quantum-entangled states with many degrees of freedom, where rich emergent phenomena can arise. This spans across the fields of condensed matter physics and quantum information theory, using a diverse toolbox including tensor network states and field theory. In addition to studying theoretical questions for the sake of understanding many-body entanglement, Verresen also regularly collaborates with experimental labs to bring these concepts to life.



Shuolong Yang

Assistant Professor of Molecular Engineering

Institutes: Chicago Quantum Institute

Research areas: Experimental Condensed Matter Physics, Quantum Materials Engineering, Thin-Film Deposition, Ultrafast Photoemission Spectroscopy

Yang utilizes molecular beam epitaxy to engineer quantum materials layer by layer, and characterizes the electronic properties of these materials using equilibrium and non-equilibrium photoemission spectroscopies. He is primarily interested in the quantum phenomena emerging at material interfaces, such as interfacial superconductivity and topological orders.



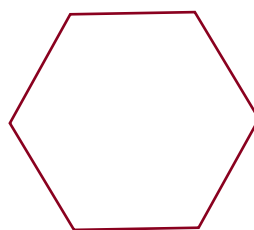
Tian Zhong

Assistant Professor of Molecular Engineering

Institutes: Chicago Quantum Institute, STAGE Center

Research areas: Quantum Photonics, Quantum Information, Quantum Networking, Solid-State Quantum Technologies

Zhong focuses on developing enabling nanoscale photonic and molecular (e.g., rare-earth-ion-doped crystals) technologies for building quantum hardware to realize an efficient, scalable quantum internet.



Materials and Sustainability



Paul Alivisatos

President, The University of Chicago; John D. MacArthur Distinguished Service Professor, Department of Chemistry, UChicago PME, James Franck Institute, and the College

Institutes: Materials and Sustainability, Chicago Quantum Institute

Research areas: Nanomaterials, Nanocrystals, Biomedicine, Renewable Energy, Quantum Information Systems, Catalysis, Opto-electronics, Advanced Electron Microscopy Methods

Alivisatos has pioneered breakthroughs in nanomaterials, contributing to the fundamental physical chemistry of nanocrystals. His inventions are widely used in biomedicine and QLED TV displays.



Chibueze Amanchukwu

Neubauer Family Assistant Professor of Molecular Engineering

Institutes: Materials and Sustainability

Research areas: Energy, Electrochemistry, Batteries, Electrolytes, Carbon Dioxide Capture

Amanchukwu's research is focused on sustainable energy, and involves the design, synthesis, and understanding of ion transport in electrolytes for batteries and electrocatalysis. His team focuses on advanced energy storage devices and carbon capture technology. His work has been recognized with the NSF CAREER award, CIFAR Azrieli Global Scholar award, 3M Non-Tenured Faculty Award, and ECS-Toyota Young Investigator Fellowship, among others.



Junhong Chen

Crown Family Professor of Molecular Engineering; Lead Water Strategist, Argonne National Laboratory; Co-PI and Use-inspired R&D Lead for the NSF Great Lakes RENEW Water Innovation Engine

Institutes: Materials and Sustainability

Research areas: Hybrid Nanomaterials, 2D Nanomaterials, Chemical and Biological Sensors, Energy Devices

Chen researches nanomaterials and nanodevices, particularly hybrid nanomaterials featuring rich interfaces and nanodevices for sustainable energy and environment. He has made seminal contributions to hybrid nanomaterials and molecular engineering, having published 320 journal papers, and is listed as a 2017–2021 highly cited researcher (top 1 percent) in materials science or cross-field by Clarivate. He is an elected fellow of Royal Society of Chemistry, National Academy of Inventors, and the American Society of Mechanical Engineers. His research has led to nine issued US patents, five pending patents, and 15 licensing agreements.



Andrew Ferguson

Professor of Molecular Engineering, Vice Dean for Education and Outreach; Director of Graduate Studies for the PhD in Molecular Engineering (Materials Track)

Institutes: Immunoengineering and Bioengineering, Materials and Sustainability

Research areas: Molecular Simulation, Statistical Thermodynamics, Machine Learning, Inverse Materials Design, Enhanced Sampling, Protein Folding, Self-Assembly

Ferguson uses molecular simulation, statistical thermodynamics, and artificial intelligence to understand and design molecules and materials, including functional proteins, self-assembling peptides, DNA oligomers, vaccine immunogens, and immunomodulators. He collaborates closely with experimentalists to realize these designs and run virtuous molecular design-build-test cycles. His group also actively develops new computational methods for collective variable discovery and enhanced sampling in molecular simulation.



Materials and Sustainability



Supratik Guha

Professor of Molecular Engineering; Senior Advisor to Argonne Physical Sciences and Engineering

Institutes: Materials and Sustainability, Chicago Quantum Institute, STAGE Center

Research areas: The discovery science and heterogeneous integration of new materials and devices for quantum and microelectronics technologies

Guha's research focuses on the discovery science of new materials, devices, and their nanofabrication for future information processing, including quantum information processing, next-generation microelectronics, and distributed sensor-based information processing. He focuses on applied research that connects oxide and semiconductor materials research with working systems and sub-systems. He is also deeply interested in how such device-based sensor networks can impact environmental issues such as water and agricultural management.



Po-Chun Hsu

Assistant Professor of Molecular Engineering

Institutes: Materials and Sustainability

Research areas: Dynamic Metamaterials, Electrochemistry, Heat Transfer, Carbon Capture, Nanofibers, Artificial Intelligence

Hsu's research focuses on innovating new materials with dynamic tunability for photon and phonon management by interrogating the fundamental light-matter interaction and structure-synthesis-property correlation. He is particularly interested in electrochemical methods that involve mixed carrier phenomena, which have potentials for energy and sustainability applications. Prof. Hsu dedicates his research efforts to innovative light- and heat-managing materials for energy, sustainability, and health applications. He is a recipient of the NSF CAREER Award (2022), Ralph E. Powe Junior Faculty Enhancement Awards (2021), MIT Technology Review Innovators Under 35 China (2020), and Sony Faculty Innovation Award (2019). His PhD thesis project in cooling textile was selected as Top Ten World-Changing Ideas by Scientific American. He is currently serving on the early-career advisory board for Nano Letter (Chair) and EcoMat.



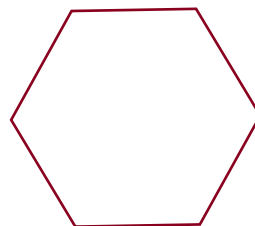
Chong Liu

Associate Professor of Molecular Engineering

Institutes: Materials and Sustainability

Research areas: Materials Science, Electrochemistry, Water, Energy, Separation

Chong Liu received her PhD in materials science and engineering at Stanford University in 2015 and her BS in chemistry from Fudan University. From 2015 to 2018, Prof. Liu was a postdoctoral researcher at Stanford University. She joined the Pritzker School of Molecular Engineering in 2018 as a Neubauer Family Assistant Professor. Liu was named a Sloan Research Fellow and a Camille Dreyfus Teacher-Scholar. Her work has been recognized with the Department of Energy's (DOE) Early Career Award, Clarivate Highly Cited Researchers, Science News SN 10 Scientists to Watch.



Materials and Sustainability



Y. Shirley Meng

Liew Family Professor of Molecular Engineering; Director, Energy Storage Research Alliance (ESRA)

Institutes: Materials and Sustainability

Research areas: Batteries, Energy Materials, Cryogenic Microscopy

Meng is a pioneer in the discovery and design of better materials for energy storage through the combination of first-principles computation guided materials discovery and design, and advanced characterization with electron/neutron/photon sources. She has received the Faraday Medal of the Royal Society of Chemistry (2020), International Battery Materials Association Research Award (2019), C.W. Tobias Young Investigator Award of the Electrochemical Society (2016), Science Award Electrochemistry by BASF and Volkswagen (2014), and NSF CAREER Award (2011). She was a finalist for the Blavatnik Awards for Young Scientists (2018).



Paul Nealey

Brady W. Dougan Professor of Molecular Engineering; Senior Scientist, Argonne National Laboratory

Institutes: Materials and Sustainability

Research areas: Block Copolymers, Directed Self-assembly (DSA), Nanolithography, Nanopatterning

Nealey's research focuses on multifunctional nanostructured polymeric materials. Directed self-assembly is often employed to impose perfection in material structure over device-relevant dimensions to enable assessment of intrinsic material properties or to impart function. Technological applications include nanolithography for the manufacture of integrated circuits and the development of ion-transporting polymers for batteries, fuel cells, and electrolyzes.



Shrayesh Patel

Associate Professor of Molecular Engineering

Institutes: Materials and Sustainability

Research areas: Functional Polymers, Block Copolymers, Batteries, Thermoelectrics, Organic Electronics

Patel's research focuses on functional polymers (e.g., electronic conductors, ion conductors, redox-active) for energy conversion and storage applications. His current efforts center on batteries and thermoelectrics. His group frequently leverages synchrotron X-ray scattering and spectroscopy techniques to advance their understanding of functional polymers at the molecular, nano-, and micro-scales.



Stuart Rowan FRS

Interim Dean; Barry L. MacLean Professor for Molecular Engineering Innovation and Enterprise, UChicago PME and the College

Institutes: Materials and Sustainability

Research areas: Polymeric Materials, Polymer Synthesis, Polymer Sustainability, Supramolecular Chemistry, Dynamic Covalent Chemistry

Rowan focuses on studying the chemistry of non-covalent interactions (supramolecular chemistry). This is embodied by studying the synthesis of metallocsupramolecular and stimuli-responsive polymers; isolation and utilization of cellulose nanocrystals in biomimetic and porous systems; and finally, reversible covalent chemistry.

Materials Systems for Sustainability



Dmitri V. Talapin

Ernest DeWitt Burton Distinguished Service Professor, Department of Chemistry, UChicago PME, and the College

Institutes: Materials and Sustainability

Research areas: Inorganic Nanomaterials, Nanocrystals, Self-Assembly

Talapin's research focuses on inorganic nanomaterials, from synthetic methodology to self-organization to charge transport and device applications. His accolades include the American Chemical Society Inorganic Nanoscience Award, Materials Research Society Outstanding Early Career Investigator Award, Top 100 chemists of the decade based on citation impact by Thomson Reuters, and Packard Fellowship in Science and Engineering.



Matthew Tirrell

Director of the Institute for Materials and Sustainability; D. Gale Johnson Distinguished Service Professor Emeritus

Institutes: Materials and Sustainability

Research areas: Biomolecular Engineering, Nanotechnology, Polymer Properties

Tirrell is a pioneering researcher in the fields of biomolecular engineering and nanotechnology, specializing in the manipulation and measurement of the surface properties of polymers, materials that consist of long, flexible chain molecules. His work combines microscopic measurements of intermolecular forces with the creation of new structures. His work has provided new insight into polymer properties, especially surface phenomena, such as adhesion, friction, and biocompatibility, and new materials based on self-assembly of synthetic and bio-inspired materials.



Sihong Wang

Associate Professor of Molecular Engineering

Institutes: Materials and Sustainability, Immunoengineering and Bioengineering

Research areas: Soft Electronic Materials and Devices, Bio-electronics, Organic Electronics, Functional Polymers, Energy Harvesting, Nanotechnology

Sihong Wang's research focuses on the development of biomimetic polymer electronics and bio-energy harvesting for interfacing with the human body and other biological systems as implantable and wearable devices. The overarching goal of the research is to develop functional polymers and devices that combine advanced electronic/photonic properties with biomimetic mechanical and chemical properties, and operation principles, for realizing the continuous, efficient, and long-term stable acquisition and processing of health data.



Jie Xu

Assistant Professor of Molecular Engineering

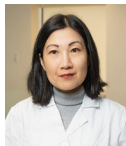
Institutes: Materials and Sustainability

Research areas: Autonomous Materials Discovery, Electronic Polymers, Polymer Packing, Phase Behavior, and Dynamics, Circular Polymer Design

Jie Xu's research integrates polymer science with AI-guided autonomous experimentation to accelerate the discovery of advanced functional polymers. Her group focuses on both polymer innovation, studying and developing materials for electronics and devices, and methodology development, advancing laboratory automation and decision intelligence through Polybot, a self-driving laboratory that links synthesis, processing, and characterization with AI/ML-guided decision-making. A unifying theme is sustainability, embedding circular materials and environmentally responsible design into new polymer technologies.



Immunoengineering and Bioengineering



Joyce Huanhuan Chen

Assistant Professor of Molecular Engineering, UChicago PME and the Ben May Department for Cancer Research

Institutes: Immunoengineering and Bioengineering

Research areas: Molecular Engineering, Cellular Engineering, Tissue Engineering, Stem Cell Biology, Cancer Biology

Chen's research aims to uncover human-specific disease mechanisms and develop new strategies for cancer research, disease modeling, and regenerative medicine by integrating stem-cell-based disease models with single-cell analysis to study tissue injury and repair, cancer development, and genetic diseases. She has received multiple honors, including an NIH MERIT Award, an NIH Pathway to Independence Award, and an NCI Physical Sciences in Oncology Young Investigator Award.



Nicolas Chevrier

Associate Professor of Molecular Engineering

Institutes: Immunoengineering and Bioengineering

Research areas: Immunology, Systems Biology

Chevrier's lab studies the general rules governing immunity and other complex biological systems. Those rules live across scales, from the whole organism down to molecules, and only surface if we can measure at all of them at once. Mostly we can't, so the lab builds the missing methods, instruments, and algorithms. They open up questions that couldn't be asked before, and they lead us to new mechanisms and concepts in immunology, disease, and biology at large. The lab shares what it builds because a tool is only as good as the questions people bring to it.



Aaron Esser-Kahn

Professor of Molecular Engineering

Institutes: Materials and Sustainability, Immunoengineering and Bioengineering

Research areas: Vascular Tissue Engineering, Immune Programming Polymers, Carbon Capture Methods

Esser-Kahn's primary area of research focuses on immune engineering and improving innate immune responses. He works on improving vaccines and cancer immunotherapies by better understanding and engineering innate immunity. His lab also focuses on materials that respond to their environment to improve performance using electricity and vibration. His lab is also interested in improving methods for carbon capture.



Margaret L. Gardel

Edward L. Ryerson Distinguished Service Professor, Department of Physics, UChicago PME, James Franck Institute, and the College

Institutes: Immunoengineering and Bioengineering, Materials and Sustainability

Research areas: Cell and Tissue Mechanics, Polymer Physics, Cell Adhesion and Migration

Gardel is interested in how collections of biological molecules build soft materials that enable cell and tissue-scale physiological processes of adhesion, migration, and shape change. She approaches these questions both through "top down" engineering and biophysical approaches to study the mechanics of epithelial cells, and through "bottom up" reconstitution of these force-activated materials in synthetic constructs.



Immunoengineering and Bioengineering



Jun Huang

Associate Professor of Molecular Engineering; Chair of the Admissions Committee

Institutes: Immunoengineering and Bioengineering

Research areas: T Cell Immunology, mRNA Nanotechnology, T Cell Receptor, Chimeric Antigen Receptor, Immunotherapy

Huang's research focuses on human immunology. His laboratory performs basic and translational research with the objective of developing effective vaccines and cell immunotherapies for the treatment of cancer, infection, and autoimmunity. He carries out basic immunological research, focusing on molecular mechanisms of T cell recognition and signaling at the single-molecule level. He performs systems immunology, studying the differentiation, exhaustion, and metabolism of T cells at the single-cell level. He engineers CAR T-cells, aiming at the treatment of cancer and autoimmunity. He develops new biomaterials, enabling the detection, profiling, and manipulation of T cells and other immune cells for diagnosis and treatment.



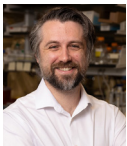
Juan Mendoza

Assistant Professor of Molecular Engineering, UChicago PME, Department of Biochemistry and Molecular Biology, and the College; Senior Advisor to the Dean for Diversity & Inclusion

Institutes: Immunoengineering and Bioengineering

Research areas: Protein Engineering, Structural Biology, Computational Biology, Immunology, Cell Signaling

Mendoza's research focuses on understanding basic principles of protein function relevant to human health and disease. Protein families of interest include the interferon (IFN) superfamily of cytokines, which are an essential part of the innate immune system, protecting against the spread of viral infections and cancerous growths. Further work in his lab focuses on developing platforms for drug discovery and computational tools to accelerate protein engineering efforts and extend our understanding of the protein sequence-structure-function paradigm to other protein superfamilies.



Mark Mimee

Assistant Professor of Microbiology and Molecular Engineering, Department of Microbiology, UChicago PME, and the College

Institutes: Immunoengineering and Bioengineering

Research areas: Synthetic Biology, Microbiome, Host-Pathogen Interactions, Antimicrobials, Biosensors

Mimee's research focuses on developing strategies to precisely engineer the activity and composition of the microbiota. By genetically manipulating commensal microbes, he seeks to create living devices that can serve as biosensors to probe the structure and function of the microbiome and as cell-based therapeutics for infectious and inflammatory disease. Additionally, he develops approaches to augment the natural properties of viruses that infect bacteria, called bacteriophages, to create novel therapies for antibiotic-resistant bacterial infections.

Immunoengineering and Bioengineering



Cathryn R. Nagler

Bunning Family Professor, Department of Pathology, UChicago PME, Department of Medicine, Department of Pediatrics, and the College

Institutes: Immunoengineering and Bioengineering

Research areas: Microbiome, Food Allergy, Oral Tolerance, Epithelial Barrier, Microbiome Modulation, Microbiome Therapeutics

Nagler studies the mechanisms governing tolerance to dietary antigens. She was one of the first to identify a link between resident intestinal bacteria and the regulation of mucosal immunity. During the last 15 years, her work has focused on examining how commensal bacteria regulate susceptibility to allergic responses to food. She has proposed that the striking generational increase in food allergies can be explained, in part, by alterations in the composition and function of the commensal microbiome.



Rama Ranganathan

Joseph Regenstein Professor, Department of Biochemistry and Molecular Biology, UChicago PME, and the College

Institutes: Immunoengineering and Bioengineering

Research areas: Bioengineering, Protein Folding

Ranganathan uses a combination of statistical genomics, biochemistry, genetics in several model organisms, structural biology, and physical theory to understand the evolutionary design of proteins and macromolecular complexes.



Samantha Riesenfeld

Assistant Professor of Molecular Engineering, UChicago PME, Department of Medicine, and the College

Institutes: Immunoengineering and Bioengineering

Research areas: Computational Biology, Genomics, Systems Immunology

Riesenfeld leads a highly interdisciplinary research group that develops and applies genomics-based machine learning methods to investigate the cellular components, transcriptional circuitry, and dynamics underlying complex biological systems. Areas of focus include inflammatory immune responses, neuroimmune interactions, and solid tumor cancer.



Milos Simic

Neubauer Family Assistant Professor of Molecular Engineering

Institutes: Immunoengineering and Bioengineering

Research areas: Cell Engineering, Synthetic Biology, Neuroinflammation, Neurodegeneration, Brain-Targeted Therapies

Simic is a synthetic immunologist developing cell-based delivery platforms for brain diseases. His research focuses on combining cell engineering and synthetic biology to understand and treat brain diseases. Simic and his colleagues pioneered the concept of a programmable “tissue GPS” for cells, allowing a cell to precisely know where it is in the body to locally execute a predefined program. This concept is currently being applied for the treatment of brain cancers, with a potential clinical trial underway, as well as the treatment of neuroinflammation.

Immunoengineering and Bioengineering



Allison Squires

Neubauer Family Assistant Professor of Molecular Engineering

Institutes: Immunoengineering and Bioengineering, Chicago Quantum Institute

Research areas: Single-Molecule Biophysics, Biomedical Devices, Fluorescence Spectroscopy and Imaging, Nanoscale Manipulation and Sensing

Squires's research interests center on manipulating, measuring, and understanding the properties and behavior of single molecules. Her lab employs single-molecule fluorescence spectroscopy and single-molecule manipulation and confinement to develop sensing platforms that report on spectroscopic identity, molecular dynamics, and nanoscale energy transfer. These approaches are useful in a wide range of scientific contexts, from observation of nanoscale biomolecular interactions in cellular signaling pathways to photoadaptation in photosynthetic systems.



Melody Swartz

William B. Ogden Professor of Molecular Engineering; Vice Dean for Faculty Affairs

Institutes: Immunoengineering and Bioengineering

Research areas: Lymphatic Physiology, Cancer Research, Immunotherapy

Swartz's research focuses on elucidating and exploiting the roles of lymphatic function as it relates to cancer and chronic inflammatory diseases, including asthma, using a variety of interdisciplinary approaches from bioengineering, immunobiology, physiology, cell biology, and biomechanics. Her lab works in both basic hypothesis-driven research as well as in translational applications.



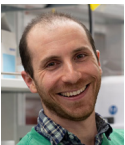
Savas Tay

Director, Immunoengineering and Bioengineering Institute; Professor of Molecular Engineering

Institutes: Immunoengineering and Bioengineering

Research areas: Single-Cell Analysis, Microfluidics, Systems Biology, Cellular Information Processing, Microengineering, Nanotechnology, Optics

Tay is a systems biologist and bioengineer who works at the interface of biology, physics, and engineering. His overarching goal is to understand how biological systems work from an engineer's perspective and use this knowledge to manipulate cells and gene pathways to help cure diseases. On the technology front, his lab develops high-throughput and high-content single-cell analysis devices by integrating microfluidics and optics.



Joshua Weinstein

Assistant Professor, UChicago PME, Department of Medicine Section of Genetic Medicine

Institutes: Immunoengineering and Bioengineering

Research areas: Biophysics, Numerical Analysis, Molecular Biology

Joshua Weinstein completed his PhD in biophysics at Stanford University and his undergraduate studies at the University of Pennsylvania. His research interests include developing DNA-based technologies for high-throughput encoding and decoding of biological information, as well as statistical models of multicellular systems. He was a 2020 Moore Inventor Fellow and 2021 Damon Runyon-Rachleff Innovator.

STAGE—Scientists, Technologists, and Artists Generating Exploration



Nancy Kawalek

Professor and Distinguished Fellow in the Arts, Sciences, and Technology

Institutes: STAGE Center

Research areas: Theatre and Performance, Science/Art Integration and Collaboration

Kawalek is an artist and innovator specializing in the creation and development of multimedia theatre inspired by science and technology. She is the founder and director of STAGE—Scientists, Technologists, and Artists Generating Exploration—a full-scale laboratory. The lab’s distinct research focuses on creating and developing new theatre, film, games, and other artistic endeavors inspired by science and technology. Rather than disguise science lectures as art, STAGE utilizes subtle parallels and metaphors between scientific themes and human experience to translate the richness and nuances of science into relatable, emotionally engaging, entertaining forms of expression. The lab harnesses the power of storytelling to promote understanding of the sciences in the public arena, catalyze the development of art that depicts the scientific and technological age in which we live, and cultivate appreciation and collaboration between the two cultures of science and art.

