

RESEARCH EXPO 2022

THURSDAY, APRIL 14 – 1:30 PM – 5PM – UC SAN DIEGO

RESEARCH EXPO 2022

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AGENDA

1:30 PM REGISTRATION

Support & Computational

2:00 PM–4:30 PM POSTER SESSION

Computational
Geometric Structures

2:30 PM–3:30 PM FACULTY LIGHTNING TALKS

Anthony H. Ault

2:30 M **Computational Modeling for Systems**

Geometric Modeling & Analysis

2:45 M **Data-AI-Centric Future Wireless**

Support & Computational

3:00 M **Ethical Sustainability; Systems and Supply Chains**

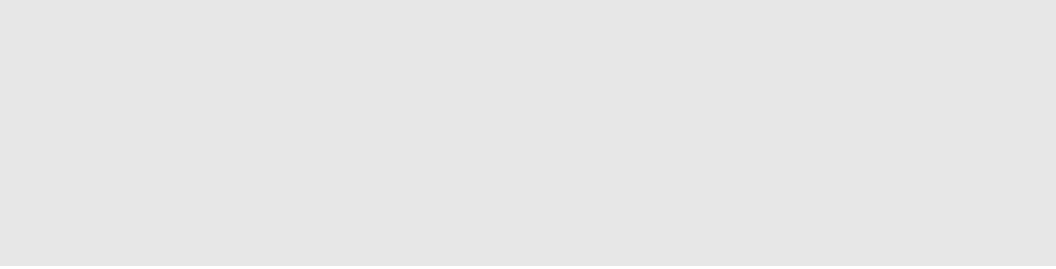
Geometric Modeling & Analysis

3:15 M **Multiscale Materials Design**

Support & Computational

3:30 PM–5 PM NETWORKING RECEPTION AND AWARDS CEREMONY

Awards Presentation
Lecture: Material, Computational





2:45 PM

DATA-AI-CENTRIC FUTURE WIRELESS

Sujit Dey

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3:15 PM

MULTISCALE MATERIALS DESIGN

Andrea Tao

Assistant Professor
Department of Mechanical Engineering
Massachusetts Institute of Technology

Abstract

For the past several years, I have been working on multiscale materials design. This involves understanding the relationship between the microstructure of a material and its macroscopic properties. I will discuss my research in this area and how it is being applied to the design of new materials.



BIOENGINEERING

100. TOWARDS AN IMPROVED METHOD FOR NEONATAL SEPSIS DIAGNOSTICS

Presenter: April Aralar | Faculty: Stephanie Fraley

101. CONTEXT-AWARE DECONVOLUTION OF CELL-CELL COMMUNICATION WITH TENSOR-CELL2CELL

Presenter: Erick Armingol | Faculty: Nathan E. Lewis

102. DO-SRS AND MPF IMAGING OF CANCER CELL METABOLIC ACTIVITIES REGULATED WITH AROMATIC AMINO ACIDS.

Presenter: Pegah Bagheri, Khang Hoang | Faculty: Lingyan Shi

103. ADAPTIVE LABORATORY EVOLUTION FOR DEVELOPMENT OF BIOSENSORS UNDER HIGH SALINITY CONDITIONS

Presenter: Alyssa Chiang | Faculty: Je Hasty

104. LABEL-FREE OPTICAL PROFILING OF CELLS AND TISSUES

Presenter: Anthony Fung, Zhi Li | Faculty: Lingyan Shi

105. DEVELOPMENT OF A RAPID CROSS-KINGDOM MOLECULAR ASSAY



COMPUTER SCIENCE & ENGINEERING

200. GLIMPSE AT MATHEMATICAL EMBEDDING OF HARDWARE
SPECIFICATION FOR FASTER NEURAL COMPILATION

211. HARDWARE FINGERPRINTING-BASED ANOMALY DETECTION FOR IDENTIFICATION OF HIDDEN DEVICES IN AN ENVIRONMENT

Presenter: Pratik Rajendra Ratadiya | Faculty: Dinesh Bharadia



ELECTRICAL & COMPUTER ENGINEERING





MECHANICAL & AEROSPACE ENGINEERING

400. ELECTRIC FIELD INDUCED HIGH NONLINEARITY IN SILICON RICH CARBIDE

Presenter: Li-Yang Chang | Faculty: Paul Yu

401. DYNAMIC WEIGHTS IN COLLABORATIVE REACTIVE POWER OPTIMIZATION FOR DISTRIBUTION SYSTEM VOLTAGE REGULATION

Presenter: Cristian Cortes | Faculty: Jan Kleissl

402. SCALABLE ENFORCEMENT OF SHAPE AND COLLISION CONSTRAINTS FOR GRADIENT-BASED OPTIMIZATION

Presenter: Ryan Dunn | Faculty: John T. Hwang

412. AUTONOMOUS ACTUATION OF FLAPPING WING ROBOTS INSPIRED BY ASYNCHRONOUS INSECT MUSCLE

Presenter: James Lynch | Faculty: Nick Gravish

413. SCOPING STUDIES OF PLASMA DETACHMENT IN LONG-LEG DIVERTOR GEOMETRIES

Presenter: Rebecca Masline | Faculty: Sergei Krasheninnikov

414. PARTICLE FORMATION MECHANISM OF BISMUTH FERRITE: MATERIALS BY DESIGN FOR ANTIFERROMAGNETIC AND FERROELECTRIC APPLICATIONS

Presenter: Jenna Metera | Faculty: Olivia A. Graeve

415. TAILORED MORPHOLOGY OF TAC NANOPARTICLES BY INTRODUCTION OF TRANSITION METAL DOPANTS

Presenter: Stephanie Ortega | Faculty: Olivia Graeve

416. ADDITIVE MANUFACTURING UTILIZING A NOVEL IN-LINE MIXING SYSTEM FOR MULTI-SCALE DESIGN OF CERAMIC COMPOSITES

Presenter: Joshua Pelz | Faculty: Marc A. Meyers

417. HIGH ENERGY DENSITY BATTERY BASED ON CFX CATHODE MATERIAL

Presenter: Baharak Sayahpour | Faculty: Shirley Meng

418. TRANSENDOTHELIAL MIGRATION ALTERS SUBSEQUENT NEUTROPHIL INTERSTITIAL MIGRATION PHENOTYPE IN 3D MATRICES

Presenter: Amy Schwartz | Faculty: Antonio Sanchez

419. AQUATIC LOCOMOTION USING CURVATURE PROPERTIES OF TAPE SPRINGS

Presenter: Curtis Sparks | Faculty: Nick Gravish

420. IMMOBILIZATION AND CATALYTIC PROPERTIES OF LACCASE ON CUO NANOPARTICLES

Presenter: Francisco Suarez | Faculty: Olivia Graeve

421. PROCESSING OF HIGH ENTROPY METAL CARBIDES: A NEW CLASS OF ULTRAHIGH TEMPERATURE, IRRADIATION RESISTANT CERAMICS

Presenter: Ved Vakharia | Faculty: Olivia A. Graeve

422. MICROSCALE CONCERT HALL ACOUSTICS FOR SONOGENETICS

Presenter: Aditya Vasan | Faculty: James Friend

423. GROUND FRICTION LIMITATIONS FOR HIGH TRACTION LEGGED MANEUVERS IN COCKROACHES

Presenter: Ruiqi Wang, Yakun Cao | Faculty: Nick Gravish

424. ROBUST PERPENDICULAR MAGNETIC ANISOTROPY IN OFF-AXIS SPUTTERED EUROPIUM IRON GARNET (EUIG) THIN FILMS

Presenter: Chad Warren | Faculty: Javier E. Garay

425. COLLECTIVE BEHAVIOR OF CHASING VEHICLES, DECENTRALIZED CONTROL OF THE GROUP FORMATION WITH LIMITED SENSING

Presenter: Rundong Yang, Wei Zhou | Faculty: Nicholas Gravish

426. MEM3DG: MODELING MEMBRANE MECHANOCHEMICAL DYNAMICS IN 3D USING DISCRETE DIFFERENTIAL GEOMETRY

Presenter: Cuncheng Zhu | Faculty: Padmini Rangamani

NANOENGINEERING

500. PROBING THE MOLECULAR INTERACTIONS BETWEEN THE IMMOBILIZED MOLECULAR CATALYSTS AND THE MULTI-WALLED CARBON NANOTUBE SUPPORT FOR CO₂ REDUCTION IN NEAR NEUTRAL PH AQUEOUS ENVIRONMENTS

Presenter: Thomas Chan | Faculty: Clifford P. Kubiak

501. NEEDLE-FREE GLUCOSE MONITORING USING A WEARABLE PATCH

Presenter: Ernesto De la Paz Andres | Faculty: Joseph Wang

502. ENTROPIC INSIGHTS INTO THE STRUCTURING OF WATER

Presenter: Alexandria Do, Emily Infante | Faculty: Tod Pascal

503. MACHINE LEARNING IS A USEFUL TOOL TO PREDICT AND UNDERSTAND SEA-ICE DYNAMICS IN THE ARCTIC.

Presenter: Lauren Hoffman | Faculty: Matt Mazlo

504. MODELING BACKBONE RIGIDITY IN CONJUGATED POLYMERS

Presenter: Andrew Kleinschmidt | Faculty: Darren Lipomi, Tod Pascal

505. IN VITRO ASSESSMENT OF DRUG-INDUCED CARDIOTOXICITY THROUGH SIMULTANEOUS MEASUREMENT OF ACTION POTENTIALS AND CONTRACTILE FORCES OF HUMAN CARDIOMYOCYTES

Presenter: Dhivya Pushpa Meganathan | Faculty: Zeinab Jahed

506. MICROENGINES IN A PILL: IMPROVING DISTRIBUTION AND BIOAVAILABILITY OF ORALLY DELIVERED DRUGS

Presenter: Rodolfo Andres Mundaca Uribe | Faculty: Joseph Wang

507. MONITORING LIQUID SWALLOW BEHAVIOR USING EPIDERMAL STRAIN AND EMG SENSORS

Presenter: Beril Polat | Faculty: Darren Lipomi

508. FULLY TEXTURED HIGH-EFFICIENCY MONOLITHIC PEROVSKITE/SILICON TANDEM SOLAR CELLS

Presenter: Rory Runser | Faculty: Darren Lipomi

509. GREEN METAL-ORGANIC FRAMEWORKS FOR EFFICIENT CATALYTIC

510. MOISTURE INGRESS AND DISTRIBUTION IN BIFACIAL SILICON PHOTOVOLTAICS

Presenter: Tala Sidawi | Faculty: David Fenning

511. CURVATURE-SELECTIVE NANOCRYSTAL SURFACE LIGATION USING STERICALLY-ENCUMBERED METAL-COORDINATING LIGANDS

Presenter: Yufei Wang | Faculty: Andrea Tao

512. TOUCH-BASED CHEMICAL SENSING PLATFORM FOR RAPID, NON-INVASIVE BIOMARKER MONITORING

Presenter: Lu Yin | Faculty: Joseph Wang

513. ACHIEVING LOW-TEMPERATURE HYDROTHERMAL RELITHIATION BY REDOX MEDIATION FOR DIRECT RECYCLING OF SPENT LI-ION BATTERY CATHODE

Presenter: Xiaolu Yu | Faculty: Zheng Chen

514. MICROPHASE SEPARATION DRIVEN SEQUENTIAL SELF FOLDING OF SOFT ACTUATORS

Presenter: Jiayu Zhao | Faculty: Jinhye Bae



STRUCTURAL ENGINEERING

600. THERMAL EFFECTS ON SOFT SOIL BEHAVIOR AND ITS APPLICATIONS

Presenter: Radhavi Abeyesiridara Samarakoon | Faculty: John McCartney

601. MOAT WALL POUNDING FOR A PROTOTYPE BASE-ISOLATED BUILDING IN WELLINGTON, NEW ZEALAND

Presenter: Ricardo Bustamante | Faculty: Gilberto Mosqueda

602. HIGH-SPEED ULTRASONIC RAIL INSPECTION

Presenter: Diptojit Datta | Faculty: Francesco Lanza di Scalea

603. DEVELOPMENT OF RAIL FLAW IMAGING TECHNOLOGY BASED ON ULTRASONIC TOMOGRAPHY

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A woman with long brown hair, wearing a yellow sweater and grey pants, is sitting in a blue office chair. She is smiling and looking down at a laptop computer on her lap. The laptop screen shows the text "Our technology begins" in a stylized font. The background is a dense wall of green foliage. The overall image has a dark, semi-transparent overlay.

ASML

**Our technology
is shaping the
future worldwide**

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