

27th AACGE Western Section Conference on Crystal Growth & Epitaxy

Stanford Sierra Camp, Fallen Leaf Lake, CA
June 12-15, 2022



Welcome to

Stanford Sierra Conference Center

The following information will help you during your stay at our lakeside retreat and enjoy your visit to the fullest!

The best way to keep in touch with the office and home is to bring a laptop with wireless capability. Our wireless network is available throughout the camp, including lodge rooms, meeting rooms, and common areas in the main lodge, as well as in the cabins.

Cell service is spotty and inconsistent at Fallen Leaf Lake so plan to be without cell reception during your stay.

You can receive phone messages at 530-541-1244. You can receive faxes at 530-541-2212.

Registration, registration payment, and registration concerns can be emailed to aacg@comcast.net. Visit www.crystalgrowth.org to register and/or pay online.

We post phone messages and faxes on the guest message board across from the office. Check out time on departure day is 10:00.

Our website is www.stanfordsierra.com.

Morgan Marshall
Sales & Marketing Director
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Conference Contacts

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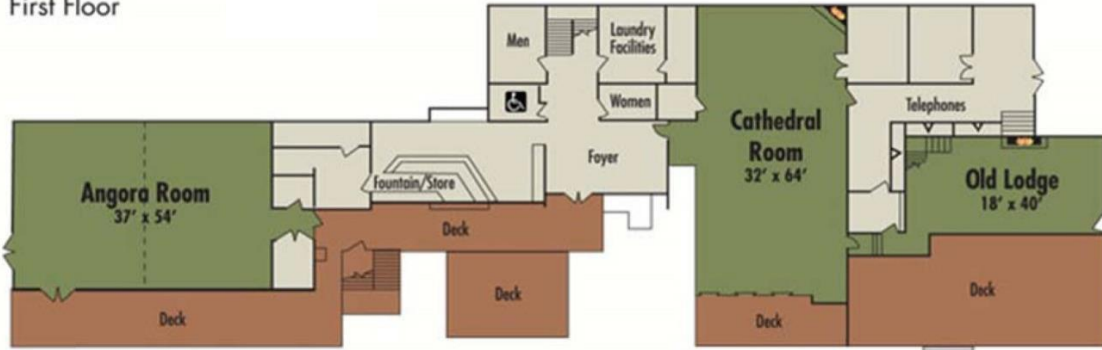
Heraeus



Lawrence Livermore National Laboratory

Main Lodge Facilities

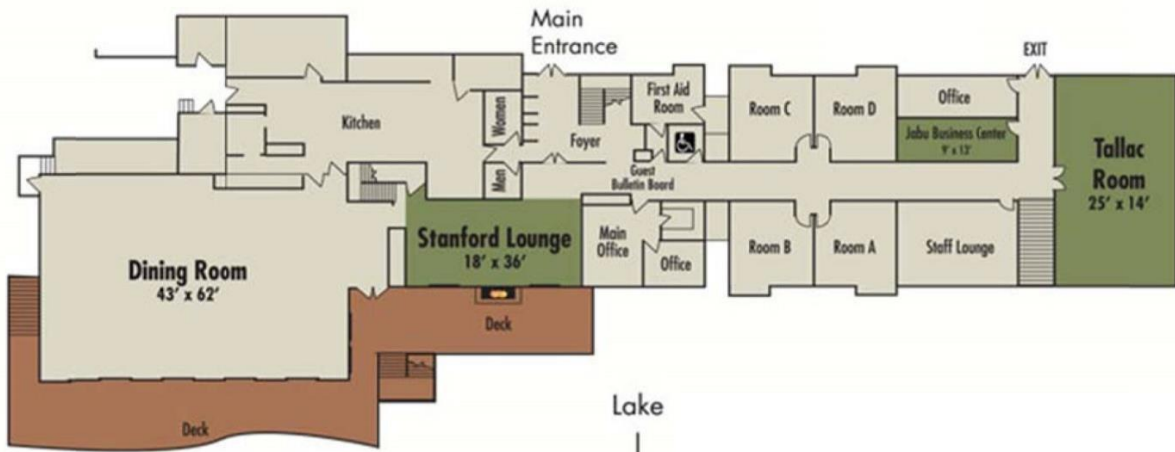
First Floor



Lake



Second Floor



Lake



 = Fireplace

Cell Phone reception at Fallen Leaf Lake is inconsistent.

High-Speed Internet available in all rooms and on main lodge decks.

Program Guide

Sunday, June 12

Old Lodge Deck	15:00 – 18:00	Check-In & Registration (Before checking in, please register and pay online: www.crystalgrowth.org)
Old Lodge Deck	16:30 – 18:00	Welcome Reception
Dining Room	18:00 – 19:30	Dinner
Cathedral Room	19:30 – 21:10	Biomimetics/Biomineralization

Monday, June 13

Dining Room	7:30 – 9:00	Breakfast
Cathedral Room	9:00 – 10:50	Biomineralization
	10:50 – 11:10	BREAK
Cathedral Room	11:10 – 12:00	Catalytic Materials
Dining Room	12:00 – 13:30	Lunch
	13:30 – 16:00	Camp Activities Unscheduled Time
Angora Room	16:00 – 18:00	Poster Session (1 of 2)
Dining Room	18:00 – 19:30	Dinner
Cathedral Room	19:30 – 21:10	Fundamentals of Crystallization

Tuesday, June 14

Dining Room	7:30 – 9:00	Breakfast
Cathedral Room	9:00 – 10:00	Energy Materials
	10:00 – 10:20	BREAK
Cathedral Room	10:20 – 12:00	Synthesis and Characterization
Dining Room	12:00 – 13:30	Lunch
	13:30 – 16:30	Camp Activities Unscheduled Time
Angora Room	16:00 – 18:00	Poster Session (2 of 2)
Dining Room	18:00 – 19:30	Dinner
Cathedral Room	19:30 – 21:00	Self-Assembly

Wednesday, June 15

Dining Room	7:30 – 9:00	Breakfast
Cathedral Room	9:00 – 9:50	Biomimetics
	9:50 – 10:00	BREAK
Cathedral Room	10:10 – 12:10	Fundamentals of Crystallization
Dining Room	12:10	Snack Lunch
	13:30	Departure

Sunday, June 12, 2022

19:30 – 21:10 Biomimetics / Biomineralization

Cathedral Room

- 19:30-20:00 Programming Cells to Assemble Ordered Living Materials
Caroline Ajo-Franklin; BioSciences, Rice University, USA
- 20:00-20:30 Multiscale Architected Impact Resistant Biological Coatings
David Kisailus; Materials Science and Engineering, University of California at Irvine, CA/USA
- 20:30-20:50 Amelogenin-derived Peptide-Chitosan Hydrogel for Dentin Repair
Jing Cai; Janet Moradian-Oldak; Center for Craniofacial Molecular Biology, Herman Ostrow School of Dentistry, University of Southern California
- 20:50-21:10 Mineralization and Phase Transformation of Mesocrystalline Iron Oxides in the Abrasion-resistant Chiton Teeth
Taifeng Wang; Wei Huang; Satoshi Murata; Michiko Nemeto; Atsushi Arakaki; David Kisailus; Materials Science and Engineering, University of California at Irvine, CA/USA

Monday, June 13, 2022

09:00 – 10:50 Biomineralization

Cathedral Room

Chair: Chun-Long Chen

- 09:00-09:30 Bio-inspired Self-templating Material Assembly and Applications
Seung-Wuk Lee^{1,2}; ¹Bioengineering, University of California, Berkeley; ²Lawrence Berkeley National Laboratory, Berkeley, CA/USA
- 09:30-09:50 In Situ AFM Study of Self-assembly of Highly Stable Membrane-mimetic 2D Peptoid Crystals
Sakshi Yadav; Physical Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA
- 09:50-10:10 Hierarchical Organic-Inorganic Hybrid Materials with High-Information-Content Building Blocks
Jinrong Ma¹; Biao Jin²; Kathryn N. Guye³; Md. Emtias Chowdhury²; Chun-Long Chen^{1,2}; James J. De Yoreo²; François Baneyx³; ¹Molecular Engineering and Science Institute, University of Washington, WA/USA, ²Physical and Computational Sciences Directorate, Pacific Northwest National Laboratory, WA/USA, ³Department of Chemical Engineering, University of Washington; WA/USA

10:10-10:30 Important Factors Affecting the Regionalized Nanomechanical Properties of Flexible Yet Stiff Stylus of Chiton
Jung-Eun Lee¹; John Connolloy²; Wen Yang¹; Guillaume Freychet³; Taifeng Wang¹; Steven A. Herrera⁴; Satoshi Murata⁵; Phani Saketh Dasika²; Devis Montroni¹; Chenhui Zhu⁴; Mikhail Zhernenkov³; Richard Wuhler⁶; Leigh Sheppard⁶; Michiko Nemoto⁷; Atsushi Arakaki⁵; Pablo Zavattieri²; David Kisailus¹;
¹Department of Materials Science and Engineering, University of California, Irvine, CA/USA, ²Lyles School of Civil Engineering, Purdue University, West Lafayette, IN/USA, ³National Synchrotron Light Source, Brookhaven National Laboratory, NY/USA, ⁴Materials Science and Engineering Program, University of California, Riverside, CA/USA, ⁵Institute of Engineering, Tokyo University of Agriculture and Technology, Japan, ⁶Advanced Materials Characterization Facility, Western Sydney University, Australia, ⁷Department of Chemistry, University of California, Riverside, CA/USA

10:30-10:50 The Effect of Non-collagenous Protein, alpha-2-HS-glycoprotein, on the Crystal Growth of Single Crystalline Hydroxyapatite
John Mergo¹; Andreas Picker²; Willi Jahnen-Dechent³; Jinhui Tao⁴; Jong Seto⁵;
¹Aerospace Corporation, ²Kao Corporation, ³University Clinic of Aachen, Germany, ⁴Physical Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA, ⁵School for the Engineering of Matter, Transport, and Energy, Arizona State University, AZ/USA

11:10 – 12:00 Catalytic Materials

Cathedral Room

Chair: Chinmayee Subban

11:10-11:40 Understanding the Nanoscale Structure-Function Relation in Pt Alloy ORR Catalysts
Yu Huang; Department of Materials Science and Engineering, University of California Los Angeles, CA/USA

11:40-12:00 Templated Synthesis and Role of Crystallographic Orientation of Transition Metals within Graphitic Nanofibers for Oxygen Reduction Reactions
Sivasankara Rao Ede; David Kisailus; Department of Materials Science and Engineering, University of California, Irvine, CA/USA

16:00 – 18:00 Poster Session (1 of 2)

Angora Room

Chair: Jinhui Tao

~~P1-1~~ Effect of transition metal (Fe, Co) ion doping on TiO₂ Nano particles
Kirit Kumar Siddhapara, Dimple Shah, S.V. National Institute of Technology, Surat-395007, Gujarat, India

- ~~P1-2 Piezoelectric single crystals and nanoparticles for medical applications
Nidhi Sinha^{1,2}; Binay Kumar¹; ¹Department of Physics & Astrophysics, ²Electronics-Department, SGTB Khalsa College University of Delhi, Delhi, India~~
- P1-3 Characterization of SrSO₄ Endoskeleton and Spicular Features of Acantharia Using X-Ray Nanotomography and Image Segmentation
Dawn Raja Somu¹; Imke Greving²; Vivian Merk¹; ¹Department of Chemistry & Biochemistry and Department of Ocean & Mechanical Engineering, Florida Atlantic University, Boca Raton, FL/USA, ²Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Geesthacht, Germany
- P1-4 Polymer Assisted Growth of Metal/Metal Oxide Nanoparticles for Sensing Applications
Chao Hsuan (Joseph) Sung; Suparna Das; David Kisailus; Materials Science and Engineering, University of California, Irvine, CA/USA
- P1-5 Visualizing Protein-Mineral Interfaces using Atom Probe Tomography
Sandra Taylor¹; Jinhui Tao¹; Jack Grimm^{1,2}; Yongsoon Shin¹; Garry W. Buchko^{1,3}; Bojana Ginovska¹; Wendy J. Shaw¹; Barbara J. Tarasevich¹; Arun Devaraj¹; ¹Physical and Computational Sciences, Pacific Northwest National Laboratory, Richland, WA/USA, ²Materials Science and Engineering Department, University of Washington, Seattle, WA/USA, ³School of Molecular Biosciences, Washington State University, Pullman, WA/USA
- ~~P1-6 Extended Length Scale Self-Assembly of Shaped NanoCrystal: New Insight
Teyeb Ould Ely; Chemical Engineering University of California Santa Barbara, CA/USA~~
- P1-7 Peptide assisted 1D assembly towards Pt-Au heteronanowire catalyst for methanol oxidation reaction
Yang Liu; Enbo Zhu; Jin Huang; Yu Huang; Department of Materials Science and Engineering, University of California, Los Angeles, CA/USA
- ~~P1-8 Processing of concentrated solar PV modules on the basis of Al-Ga-As-GaAs hetero-structures
Ia Trapaidze; Institution Georgian State Electrosystem, Georgian Technical University, GA/USA~~

~~P1-9 Growth and Characterization of Xylenol orange tetrasodium salt added KAP single-crystal~~

~~Rajesh Paulraj; G. Babu Rao; P. Ramasamy; Department of Physics, SSN College of Engineering, kallavakkam-603 110, Tamilnadu, India~~

P1-10 Marangoni Effects on the Horizontal Ribbon Growth Production of Silicon Wafers
Nojan Bagheri-Sadeghi; Brian T. Helenbrook; Department of Mechanical and Aerospace Engineering, Clarkson University, NY/USA

P1-11 Improved Scalability of Palladium Nanocrystal Synthesis
Carly Hui; David B. Robinson; Declan Mahaffey-Dowd; Vitalie Stavila; Ryan Nishimoto; Joshua Sugar; Jeffery Chames; Energy Nanomaterials, Sandia National Laboratories, CA/USA

19:30 - 21:10 Fundamentals of Crystallization
Cathedral Room
Chair: Chris Orme

19:30-20:00 Helicoidal Crystal Growth and Charge Transport
Yongfan Yang; Yuze Zhang; Sehee Jeong; Stephanie Lee; Alexander G. Shtukenberg; Bart Kahr; Department of Chemistry and Molecular Design Institute, New York University, New York City, NY/USA

20:00-20:30 Ion Heating and Rate Enhancement by Stochastic Electric Fields
Bret N. Flanders¹; Krishna R. Panta¹; Shital B. Rijal¹; Xiaojie Xu²; Christine A. Orme²; ¹Kansas State University, KS/USA, ²Lawrence Livermore National Laboratory, Livermore, CA/USA

20:30-20:50 The Incorporation of the Etioporphyrin I molecules into Kinks occurs in Two-steps
Lakshmanji Verma; Rajshree Chakrabarti; Jeremy C. Palmer; Peter G. Vekilov; William A. Brookshire Department of Chemical and Biomolecular Engineering, University of Houston, TX/USA

20:50-21:10 Thermodynamic and kinetic modulation of methylammonium lead bromide crystallization revealed by in situ monitoring

Amnon Ortoll-Bloch¹; Ying Chen²; Nancy M. Washton²; Karl T. Mueller²; James De Yoreo^{2,3}; Jinhui Tao²; Lara Estroff^{4,5}; ¹Department of Chemistry and Chemical Biology, Cornell University, Ithaca, NY/USA, ²Physical and Computational Sciences Directorate, Pacific Northwest National Laboratory, Richland, WA/USA, ³Department of Materials Science and Engineering, University of Washington, Seattle, WA/USA, ⁴Department of Materials Science and Engineering, Cornell University, Ithaca, NY/USA, ⁵Kavli Institute at Cornell for Nanoscale Science, Cornell University, Ithaca, NY/USA & Current affiliation: Department of Chemistry, Williams College, Williamstown, MA/USA

Tuesday, June 14, 2022

09:00 - 10:00 Energy Materials
Cathedral Room
Chair: Jun Liu

09:00-09:30 Ultrafast Energy Storage Using Nanoscale Oxides Spanning from Amorphous to Crystalline
Morgan Stefik; Chemistry and Biochemistry, University of South Carolina, SC/USA

09:30-10:00 Electrochemically-induced Amorphous to Crystalline Transformation in Niobium Oxide Electrodes for Lithium-ion Batteries
Hui (Claire) Xiong; Materials Science and Engineering, Boise State University, ID/USA

10:20 - 12:00 Synthesis and
Characterization
Cathedral Room
Chair: Yu Huang

10:20-10:50 Selective area growth of III-V nanowires on Silicon by MOCVD
Xiuling Li; Electrical and Computer Engineering, University of Texas at Austin, TX/USA

10:50-11:20 Synthesis and X-ray spectroscopic characterization of uranium oxide at the nanoscale
Liane Moreau; Chemistry, Washington State University, WA/USA

11:20-11:40 Electrolytic Limestone Generation—Challenges and Opportunities
Chinmayee Subban^{1,2}; ¹Energy and Environment Directorate, Pacific Northwest National Lab, Richland, WA/USA; ²Materials Science and Engineering, University of Washington, WA/USA

11:40-12:00 Flow-assisted selective mineralization
Qingpu Wang¹; Elias Nakouzi¹; Elisabeth A. Ryan²; Chinmayee V. Subban^{1,2}; ¹Pacific Northwest National Laboratory, Richland, WA/USA; ²Department of Materials Science and Engineering, University of Washington, Seattle, WA/USA

16:00 - 18:00 Poster Session (2 of 2)
Angora Room
Chair: Jinhui Tao

P2-1 Quantitative Topographical Analysis of Anatase Thin Films Measured by AFM

Joachim Schuder; Marissa Martinez; Andrew S. Ichimura; Chemistry and Biochemistry, San Francisco State University, CA/USA

P2-2 Controlled 2D peptide assembly on twisted van der Waals substrates

Ying Xia^{1,2}; Yuzhou Zhao³; Susrut Akkineni^{1,2}; Song Jin⁴; Shuai Zhang^{1,2}; Jim De Yoreo^{1,2}; Jun Liu^{1,5}; ¹Materials Science and Engineering, University of Washington, Seattle, WA/USA, ²Physical Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA, ³Department of Physics, University of Washington, Seattle, WA/USA, ⁴Department of Chemistry, University of Wisconsin-Madison, Madison, WI/USA, ⁵Energy and Environmental Directorate, Pacific Northwest National Laboratory, Richland, WA/USA

P2-3 Crystallization-Driven Self-Assembly of 2D Nanostructures using Tethered Collagen Triple Helices

Douglas Zhang; Andrea Merg; Materials and Biomaterials Science and Engineering, University of California, Merced, CA/USA

P2-4 Sequence Engineered Coiled Coil Peptide Tile Building Blocks

Anthony R. Perez; Andrea Merg; Chemistry and Biochemistry, University of California, Merced, CA/USA

P2-5 Coagulation of Casein Micelles Facilitates Strength Development in EICP

Vinay Krishnan; School of Sustainable Engineering and the Built Environment, Arizona State University, AZ/USA

- P2-6 Bio-inspired impact resistant coatings
Taige Hao; Wei Huang; David Kisailus; Materials Science and Engineering,
 Univeristy of California, Irvine, CA/USA
- P2-7 Designing Sequence-Defined Peptoids for Biomimetic Control over Inorganic
 Crystallization
Chun-Long Chen; Physical Sciences Division, Pacific Northwest National Laboratory,
 Richland, WA/USA
- P2-8 Orientated self-assembly and phase transition of silk fibroin observed by in-situ atomic
 force microscopy
Chenyang Shi^{1,2,3}; Shuai Zhang^{1,2}; Xiang Yang Liu³; James De Yoreo^{1,2}; ¹Physical
 Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA,
²Department of Materials Science and Engineering, University of Washington, Seattle,
 WA/USA, ³College of Materials, Xiamen University, Xiamen, China
- P2-9 A Comparison of Solid Electrolyte Interphase Evolution on Highly Oriented Pyrolytic
 and Disordered Graphite Negative Electrodes in Lithium-ion Batteries
Joshua Russell; Haoyu Zhu; Pete Barnes; I. Francis Cheng; Eric J. Dufek; Paul Davis;
 Hui (Claire) Xiong; Materials Science & Engineering, Boise State University, ID/USA
- P2-10 Crystallization kinetics of fluoropolymers as a function thermal history and
 composition
 Xiaojie Xu; James Lewicki; Christine Orme; Materials Science Division, Lawrence
 Livermore National Lab, Livermore, CA/USA

19:30 - 21:00 Self-Assembly

Cathedral Room

Chair: David Kisailus

- 19:30-20:00 Self-assembly of virus-like particles into ordered three-dimensional protein arrays
Masaki Uchida¹; Nicholas E. Brunk²; Nathasha D. Hewagama²; Elia Manzo¹; Risako
 Fukazawa¹; Byeongdu Lee³; Peter E. Prevelige Jr.⁴; Vikram Jadhao²; Trevor Douglas²;
¹California State University, Fresno, CA/USA; ²Indiana University, Bloomington,
 IN/USA, ³Argonne National Laboratory, IL/USA, ⁴University of Alabama at
 Birmingham, AL/USA

- 20:00-20:20 Insights into the molecular cage flexibility of DNA origami 2D lattice
Jianfang Liu¹, Shih-Ting Wang², Meng Zhang¹, Zijian Hu^{1,3}, Hao Wu³, Oleg Gang^{2,4,5}; Gang Ren¹; ¹The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA/USA; ²Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, NY/USA; ³College of Artificial Intelligence, Beijing Normal University, Beijing, China; ⁴Department of Chemical Engineering, Columbia University, New York City, NY/USA; ⁵Department of Applied Physics and Applied Mathematics, Columbia University, New York City, NY/USA
- 20:20-20:40 Hierarchical structures of R-bodies, a pH-driven force generator in bacteria
Shuai Zhang^{1,2}; Guangyang Cai³; Jiajun Chen⁴; Paul Ashby⁴; Justin Kollman³; Jim De Yoreo^{1,2}; ¹Materials Science and Engineering, University of Washington, Seattle, WA/USA, ²Physical Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA, ³Department of Biochemistry, University of Washington, Seattle, WA/USA, ⁴Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, CA/USA
- 20:40-21:00 Mineralization in Enamel and Dentin via Polymer-Induced Liquid Precursors
Johan Bonde¹, Wu Li², Laurie Gower³, Yushi Bai⁴; Stefan Habelitz⁴; ¹Division of Pure and Applied Biochemistry, Lund University, Lund, Sweden, ²School of Dentistry, Orofacial Sciences; UCSF, San Francisco, CA/USA, ³Department of Materials Science, University of Florida, Gainesville, FL/USA, ⁴School of Dentistry, Preventive and Restorative Dental Sciences, UCSF, San Francisco, CA/USA

Wednesday, June 15, 2022

- 09:00 - 9:50 Biomimetics
 Cathedral Room
 Chair: Jeff Derby
- 09:00-09:30 Discovery and elucidation of “genetic codes” for DNA-mediated synthesis of metal nanoparticles with controlled morphologies and their applications
Yi Lu; Department of Chemistry, University of Texas at Austin, TX/USA
- 09:30-9:50 Understanding the nanosheet and nanohelix transition in peptoid self-assembly
Renyu Zheng¹; Mingfei Zhao²; Kacper Lachowski¹; Andrew Ferguson²; Lilo Pozzo¹; Chun-Long Chen^{1,3}; ¹University of Washington, Seattle, WA/USA, ²University of Chicago, IL/USA, ³Pacific Northwest National Laboratory, Richland, WA/USA

- 10:10 - 12:10 Fundamentals of Crystallization
Cathedral Room Chair: Peter Vekilov
- 10:10-10:40 How to calculate nucleation parameters from atomistic simulations
Luis Zepeda-Ruiz; Materials Science Division, Lawrence Livermore National Laboratory, Livermore, CA/USA
- 10:40-11:10 Analysis Of Single-Crystal Diamond Growth Via HPHT
Scott S. Dossa¹; Ilya Ponomarev²; Boris Feigelson³; Marc Hainke^{4,5}; Christian Kranert⁵; Jochen Friedrich⁵; Jeffrey J. Derby¹; ¹Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN/USA, ²Euclid Beamlabs, LLC, Beltsville, MD/USA, ³U.S. Naval Research Laboratory, Washington, DC/USA, ⁴Ostbayerische Technische Hochschule, Amberg-Weiden, Germany, ⁵Fraunhofer IISB, Erlangen, Germany
- 11:10-11:30 Developing Simplified Dynamic Metrics for Ion Solvation Kinetics
Stephen E. Weitzner; Tuan Anh Pham; Christine A. Orme; S. Roger Qiu; Brandon C. Wood; Materials Science Division, Lawrence Livermore National Laboratory. Livermore CA/USA
- 11:30-11:50 Understanding regulation of CaCO₃ crystallization by designed helical repeats proteins through in situ imaging and spectroscopy
Biao Jin¹; Fatima Angelica Davila²; Harley Pyles²; Zheming Wang¹; David Baker²; James J. De Yoreo^{1,3}; ¹Physical Sciences Division, Pacific Northwest National Laboratory, Richland, WA/USA, ²Department of Biochemistry, University of Washington, Seattle, WA/USA, ³Department of Materials Science and Engineering, University of Washington, Seattle, WA/USA
- 11:50-12:10 The Role of Iodide in the Solution-Phase Growth of Cu Microplates
Junseok Kim; Kristen Fichthorn; Chemical Engineering, Pennsylvania State University, PA/USA



ACCGE-23.OMVPE-21

Tucson, Arizona, USA

August 13-19, 2023



Conference Organizers:

ACCGE Conference

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23rd American Conference on Crystal Growth and Epitaxy (ACCGE-23) &

21st US Workshop on Organometallic Vapor Phase Epitaxy (OMVPE-21)

to be held

August 13-18, 2023,

at

The Westin La Paloma Resort & Spa

Updates can be found on the conference website:

www.crystalconference2023.com