ICAM Newsletter. April 2024: Please Forward to Interested Parties, Colleagues and Students.

Dear Colleagues,

Welcome to the ICAM Spring 2024 Newsletter. The past year at ICAM has been one of tremendous activity, with 20 ICAM supported workshops or schools and more than 100 supported science exchanges as part of our QuantEmX, SlimEX and Accelnet programs, across the globe since the start of 2023. Our annual meeting at UC Santa Barbara in December was a great success, bringing together participants from across the globe. We are also delighted to welcome four new nodes to ICAM, Emory University in the USA, Bristol University(UK) , the Bangalore Consortium and the S. N. Bose Institute, Kolkata in India. We are in the process of seeking proposals for the 24/25 ICAM Annual Meeting and welcome proposals from our branches.

For more details, plus a report on highlights of our over the past year, please read on.

Sincerely,
Piers Coleman, Cristina Marchetti and Rajiv Singh
ICAM Co-directors.

New ICAM Nodes

We are excited to welcome four new nodes, Bristol University (UK) Emory University in Georgia, the Bangalore Consortium, led by the Indian Institute of Science in Bangalore and S. N. Bose Institute in Kolkata.

ICAM Week of Science, UCSB December 2023

Scientists from a broad range of disciplines converged on the UCSB campus for the Institute of Complex and Adaptive Matter's annual Week of Science.

ICAM held its annual "Week of Science" at UCSB in December 2023, with the participation of ICAM members from Asia, Europe and Oceania. Following a pattern of previous meetings, the symposium included talks and roundtables on new research in a diverse array of topics, from the physics of soft matter to the mechanics of living cells, and from how the

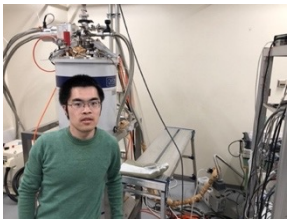
brain senses and processes odors to progress in quantum computing and the impact of advances in AI and machine learning on materials research. The 2024 Week of Science also included a workshop on accelerating the discovery of quantum materials, cohosted with UCSB's NSF-funded Quantum Foundry.

ICAM Invites Proposals for the 2024/2025 Week of Science

We are now inviting proposals for the 2025 ICAM annual meeting, combined with an accompanying ICAM supported "Frontier workshop", Following the tradition of alternating between meetings in and outside the US, we are particularly interested in proposals from our non-US nodes. Brief proposals are due by May 1st and details to be found on our website.

Quantum Materials Accelnet

The Quantum Materials Accelnet is an NSF funded project to accelerate the discovery of quantum materials through a network of international networks. We are delighted to announce the addition of the Brazilian Network on Quantum Materials, a network of seven institutions in Brazil, to the Quantum Materials Accelnet expanding it to now include ICAM and ten other networks in Canada, Europe, Brazil and Japan. All ICAM nodes in the US or outside can participate in all aspects of the Quantum Materials Accelnet. We hope to add additional nodes in India and South Korea in the near future. Quantum Materials Accelnet supports postdocs co-mentored by a US and an International mentor and international science exchanges between the US and all International institutions in the network.


Dr Weilang Yao

Our first two postdocs are close to completing their work: Dr. Weiliang Yao is currently working with Professor Pengcheng Dai at Rice University and Professor Taka Shibauchi at the University of Tokyo. At the University of Tokyo, Dr Yao has been working on Hall measurements with various magnetic field directions on single crystals of FeGe and substituted materials.



Dr Seongjoon Lim

Dr. Seongjoon Lim is currently working with works with Professor Sang Cheong at Rutgers University and Professor Hide Takagi at the Max Planck Institute at Stuttgart. At Stuttgart, Dr. Lim has been studying thermal transport in Ni3TeO6 and related low symmetry materials exploring the connection between chirality and magnetism.

Both Weiliang and Seongjoon presented their work at ICAM's annual meeting at Santa Barbara.

A third postdoc Dr. Ram Kumar starts his work this Fall and will be working with Professor Johnpierre Paglione at University of Maryland and Professor Alannah Hallas at the University of British Columbia.

QUANTEMX: The QuantemX program is a Gordon and Betty Moore Foundation supported program that has enabled over one hundred science exchanges between EPiQS (Emergent Phenomena in

Quantum Systems) and ICAM scientists as well as between ICAM scientists at two different ICAM nodes. These exchanges range from short term visits to the National High Magnetic Field Lab and to other user facilities as well as long term science exchanges for senior and junior scientists enabling them to develop new collaborations and use complimentary expertise to carry out innovative experiments in the field of Quantum Materials.

The QuantemX program also supports some workshops and schools most notably the Maryland winter school in quantum materials. Details of recently funded QuantemX fellows can be found at our website: https://www.icam-i2cam.org/quantemx-fellows

SLiMEx : Soft and Living Matter Exchange Program

Since its inception in April 2023, the SLiMEx Program has supported eight Junior short travel exchanges and one Junior Long exchange. These awards have provided the opportunity to either cement existing collaborations or start new ones, as demonstrated by the few examples below.

In February 2023 Kai Qian, a graduate student working with Nicholas Boechler in the department of Mechanical and Aerospace Engineering at UC San Diego traveled to the University of Michigan for three weeks where he visited the group of Xiaoming Mao. Kai says: ``The SLiMEx Travel award expanded my theoretical understanding of topological Maxwell lattices, providing a crucial foundation for future exploration into nonlinear dynamics in such lattices. Thanks to invaluable discussions with Nan Cheng (PhD student in Prof. Mao's group), this experience also enhanced my numerical skill set in analyzing and visualizing the distribution of zero modes in such lattices.'' Kai's visit has already resulted in one manuscript currently under revision at Physical Review X, with two more manuscripts in preparation.


Kai Qian, UC San Diego

In March 2023 Pieter Derksen, a graduate student in the experimental group of Sebastian Streichan at UC Santa Barbara, visited the theory group of Vincenzo Vitelli at the University of Chicago, where he learned how to use machine learning approaches to analyze large data sets on calcium activity of individual neurons throughout a fruit fly during locomotion.


Xingjian Hou, University of Cambridge

Xingjian Hou, a master student from the University of Cambridge, UK, benefited of a Junior Long award that allowed her to spend three months at UC Santa Barbara in Summer 2023, where she worked with Cristina Marchetti and KITP postdoc Fridtjof Brauns on a theory project aimed at quantifying the interfacial dynamics of phase separating fields with antagonistic diffusivities. This model, known as Non-Reciprocal Cahn Hilliard model, provide a generic framework for describing the rich variety of traveling and oscillating patterns observed ubiquitously in biology. During her stay Xingjian systematically derived the conditions for traveling waves and an expression for the wave velocity in a one-dimensional system. This experience also helped Xingjian learn about the US academic system and motivated her to apply to continue her graduate studies in the US.

Recent workshops and schools.

ICAM supported 17 workshops and schools in 2023, and has, or will support a further 12 in the first eight months of 2024. Workshops included "Signatures of Nonequilibrium Life" at the International Center for Theoretical Physics, Trieste Italy (May 2023), Topological Materials and Fundamental Physics (Santa Fe, NM May 2023) and "Ultracold Atomic Gases, Thirty Years of Activities and Looking forward (U. Hong Kong , December 2023). Already in the first three months of 2024, three schools have been supported by ICAM:

"Fundamentals of Quantum materials 2024: High Pressure" at the University of Maryland, Jan 2024, which provided providing hands-on experience with high pressure experiments to participating students.

"New Frontiers of Superconductivity", at the National High Magnetic Field Laboratory, Tallahassee, Jan 2024

"School on Electron Correlations and Topology", Rice University March 2024.

Upcoming ICAM Workshops and Schools

Here is a list of the ICAM workshops and schools that are taking place in the next six months.

Rice Workshop on Quantum Materials Synthesis (Rice U. Apr 9)

The Future of Condensed Matter Physics Mon, Apr 29 I University of California, Berkeley

Zhejiang Workshop on Correlated Matter, Thur, May 9 I Zhejiang University

International Summer School on Quantum Materials, Sun, May 19 I Orford, Québec, Canada

Near-Term Quantum Algorithms Quantum AlgoLab Summer School, Jun 2I Orford Quebec, Canada

Condensed Matter Physics in the City, Mon, Jun 3 I London, England

Gordon Research Conference on Correlated Electron Systems, Sun, Jun 23 I Mount Holyoke College

Quantum Geometry, Mon, Jul 1 I Pollica Physics Centre, Italy

Autumn School on Correlated Electrons: Correlations and Emergent Phases, Mon, Sep 16 I Jülich, Germany

For more details about these workshops, including application links, visit https://www.icam-i2cam.org/our-workshops.

Applications for Workshop support and Science Exchanges Now Open!

We should like to take this occasion to remind everyone about ICAM's four main areas of support, all of which are now accepting applications.

- Workshops support (Workshops from October '23- March '24). Deadline June 6th.
- Quantum Materials Accelnet – Postdoc and Travel Awards. Deadline May 31st.

- QuantEmX- Science exchanges. Deadline May 31st.
- SLiMEX- Science exchanges in Soft and Living Matter. Deadline May 31st.

We will be holding Science Steering Committee meetings in June to discuss these various applications.

Finally, we look forward to hearing from all of you across our world-wide network. We hope to include news from across our nodes in summer newsletter, so please send us your news.

Best wishes from us all,
Cristina, Piers and Rajiv

2024

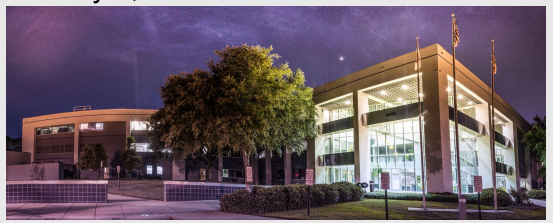
ICAM-I2CAM
Institute for Complex Adaptive Matter

Workshops and Schools

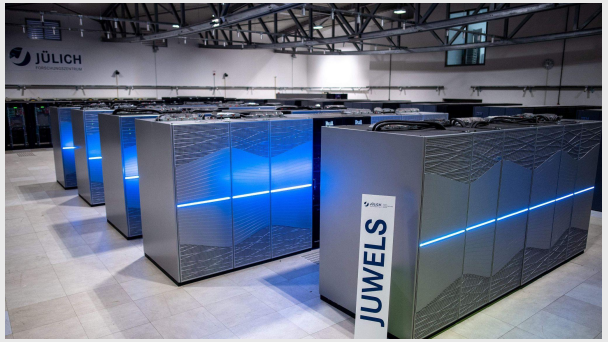
Zhejiang Workshop on Correlated Matter
Zhejiang University
May 9-12,2024

The Future of Condensed Matter Physics
University of California, Berkeley
April 29-May 1, 2024

New Frontiers of Superconductivity
Florida State University
January 8, 2024

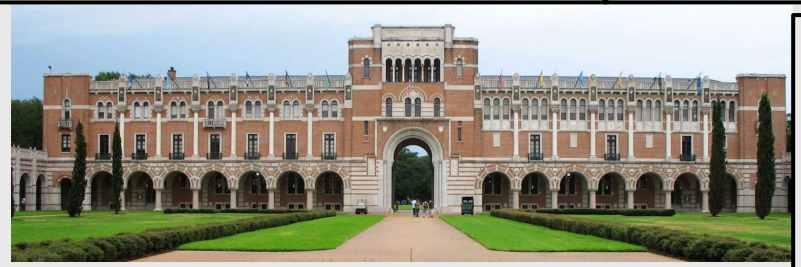


Autumn School on Correlated Electrons: Correlations and Emergent Phases
Forschungszentrum Jülich
September 16-20, 2024



School on Electron Correlations and Topology
Rice University
March 12-15, 2024

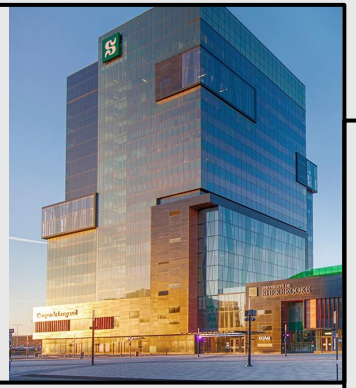
Rice Workshop on Quantum Materials Synthesis
Rice University
April 9-12, 2024



Quantum Geometry
Pollica Physics Centre
July 1-7, 2024

International Summer School on Quantum Materials
University de Sherbrooke
May 19-31, 2024

Near-Term Quantum Algorithms Quantum AlgoLab Summer School
University de Sherbrooke
June 2-14, 2024



Gordon Research Conference on Correlated Electron Systems
Mount Holyoke College
June 23, 2024

Fundamentals of Quantum Materials 2024: High Pressure
University of Maryland
Jan 15, 2024

Condensed Matter Physics in the City
University of Kent
June 3-7, 2024