UNIVERSITY OF GEORGIA
DEPARTMENT OF PHYSICS
& ASTRONOMY

CENTER FOR SIMULATIONAL PHYSICS · ATHENS, GEORGIA

CSP Futures

A Symposium on Simulation at the Frontier

Friday, November 6, 2026

Georgia Center for Continuing Education & Hotel · Athens, GA

WELCOME

Forty years of foundation. One day to shape *what comes next.*

The Center for Simulational Physics was founded in 1986 and has grown into one of the most internationally recognized research centers at the University of Georgia — a community that has shaped the global landscape of computational physics through its annual workshop series, its weekly seminar, and four decades of landmark scholarship.

Today we gather at an inflection point. With founding director David Landau approaching retirement and the department entering a bold new phase of growth, CSP Futures is designed to do something genuinely ambitious: to bring this community together — faculty, students, external scientific leaders, and supporters — to collectively define what the CSP becomes in the decade ahead.

> *"The most exciting thing about this moment is that the CSP's best chapter has not yet been written. Today, we begin writing it together."*
>
> — Keivan Stassun, Incoming Department Head

The day ahead spans the breadth of what simulational physics is becoming: from quantum materials to planet-forming disks, from AI-driven algorithms to the frontiers of gravitational-wave astrophysics. We are grateful to each of you for being part of it.

Keivan Stassun, Incoming Department Head
André Erpenbeck, Faculty Organizer, CSP Futures
with contributions from *Cassandra Hall*, Assistant Professor of Physics and Astronomy

ABOUT THE CSP

Founded in 1986 with support from UGA President Fred Davison and the Franklin College of Arts and Sciences, the Center for Simulational Physics has grown from a small condensed matter research group into an internationally recognized hub for computational physics — a genuine "meeting place" for the global simulations community.

40
Years of continuous annual workshop, attracting participants from across the globe

3
Dedicated project-based computational physics courses developed for the curriculum

NSF · DOE NASA · Simons
Major extramural funding sources supporting CSP research

∞
The frontier, still ahead

The CSP's next chapter will build on this foundation while embracing the full breadth of what simulational physics has become: from quantum materials and strongly correlated systems to astrophysical dynamics and planet formation, from soft matter and biological simulation to quantum computing and quantum information. Artificial intelligence and machine learning are emerging as powerful cross-cutting tools across all of these domains, opening new frontiers for what computational science can achieve. Today's symposium is the community's opportunity to collectively define which of these directions the CSP will pursue most boldly — and what it will need to get there.

PROGRAM

MORNING — MASTERS HALL

8:30 — **Arrival, Registration & Coffee**

Simulation visualization display — Masters Hall Foyer

9:00 — OPENING

Opening Remarks

Ron Walcott, Interim Provost, University of Georgia

Brief institutional welcome from the University's chief academic officer.

9:05 — WELCOME

Welcome, Framing, and CSP Retrospective

Keivan Stassun, Incoming Department Head

Welcome and framing of the day's purpose, followed by a brief retrospective on the CSP's forty-year history and legacy — with material provided by founding director David Landau.

9:40 — KEYNOTE

Featured Conversation

Andrew Millis · Managing Director, Flatiron Institute; Professor, Columbia University

A fireside conversation on the frontier of computational science — where the field is heading, what great centers do, and what this moment requires. Moderated by André Erpenbeck.

10:35 — NEW FACULTY

What the CSP's New Direction Means for My Research

Kamber Schwarz, Assistant Professor of Astronomy

Protoplanetary disk chemistry, planet formation, and the computational infrastructure that makes it possible.

10:55

NEW FACULTY

A New Faculty Member's Perspective on the CSP

André Erpenbeck, Assistant Professor of Physics

AI-driven hybrid quantum-classical workflows for correlated many-body dynamics — and why the CSP's next chapter is the right place to pursue them.

11:15

BREAK

Morning Break — Masters Hall Foyer

EMERGING FRONTIERS — MASTERS HALL

11:35

FRONTIER I

Astrophysical Simulation

Cassandra Hall · Assistant Professor of Physics and Astronomy

Disk dynamics, planet formation, gravitational instability, and circumgalactic simulation at the frontier of multi-messenger astrophysics.

Discussant: Jason Terry (tentative) · Postdoctoral Researcher, University of Oxford; PhD, UGA Department of Physics and Astronomy

12:05

FRONTIER II

AI and the Future of Simulation

Prashant Doshi · Professor, UGA School of Computing; UGA Institute for Artificial Intelligence

Machine learning as the next methodological frontier for simulational physics — from phase transition detection to ML-augmented molecular dynamics and beyond.

Discussant: Ying Wai Li (tentative) · Team Leader, Los Alamos National Laboratory; Adjunct Faculty, UGA Physics & Astronomy

12:35

FRONTIER III

Quantum Simulation and Quantum Materials: Where Simulation Meets Experiment

Yohannes Abate · Associate Professor of Physics and Astronomy

The CSP's distinctive simulation-experiment collaboration in quantum materials — from perovskite nickelates to memristive devices — and what it models for the future of the center.
Discussant: Steven Hancock (tentative) · Johns Hopkins Applied Physics Laboratory; PhD, UGA Center for Simulational Physics

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LUNCH — MAGNOLIA 1–2

1:00

LUNCH

Structured Lunch

Seated buffet with structured mixing. Each table begins with a brief round: "*The simulation problem I most wish I could solve.*"

AFTERNOON — DOGWOOD HALL

2:00

EDUCATION

Training the Next Generation of Computational Scientists

Craig Wiegert, Associate Department Head; and colleague

What does education research tell us about developing computational fluency and training the next generation of simulational scientists?

2:15

VISIONING

Facilitated Visioning Session: "The CSP in 2036"

In mixed groups of 6–8, participants collectively address the questions that will define the CSP's strategic direction. Outputs feed directly into the CSP's formal strategic planning process. See the following page for discussion questions.

3:45

BREAK

Afternoon Break — Dogwood Foyer

4:05

LIGHTNING TALKS

Graduate Student & Postdoc Lightning Talks

Five researchers. Five minutes each. Spanning the full range of CSP research — past, present, and future.

4:35

CLOSING

Synthesis and Forward Momentum

Keivan Stassun, Incoming Department Head

Drawing together the day's themes, announcing the Strategic Planning Committee and the launch of the endowed chair campaign, and opening the floor briefly for any final thoughts from the community.

EVENING — HILL ATRIUM

5:00

RECEPTION

Evening Reception

Hill Atrium, Georgia Center for Continuing Education & Hotel

5:30

REMARKS

Brief Remarks — VIP Guests

Informal words of congratulation and appreciation from two guests of honor. 2–3 minutes each.

AFTERNOON VISIONING SESSION

The afternoon facilitated session — "The CSP in 2036" — is the intellectual heart of the day. In groups of six to eight, you will work through the questions below with colleagues from across departments, disciplines, and career stages. The outputs will feed directly into the CSP's formal strategic planning process and the February 2027 annual workshop.

01 What problems currently unsolvable should the CSP be attacking by 2036 — and which adjacent disciplines do we need to tackle them?

02 What would make UGA's CSP *the* place to do simulational science — and what can we learn from the Flatiron Institute model?

03 What does the CSP need — in people, infrastructure, and partnerships — to get there?

04 Which core areas of physics and adjacent disciplines are missing from the CSP's current identity and should be part of its future?

05 What do we do about AI — as a tool, as a methodology, and as a force reshaping what simulational physics means?

06 How do we train the next generation of simulational scientists — and what would world-class training at UGA look like in 2036?

07 How do we build and sustain the international community around the CSP — and what should the center's role as a global meeting place look like in its next chapter?

08 What is the CSP's relationship to national computing infrastructure — and what does UGA owe the CSP in terms of local computational resources?

SPEAKERS

RW

Ron R. Walcott

Interim Senior Vice President for Academic Affairs and Provost
University of Georgia

Ron Walcott began his tenure as UGA's Interim Provost on August 1, 2026, having previously served as the inaugural Vice Provost for Graduate Education and Dean of the Graduate School — a role in which he oversaw a 20% increase in graduate enrollment and an 82% increase in scholarships and fellowships for graduate students. A professor of plant pathology with more than 27 years at UGA, he has served in numerous administrative and faculty leadership roles and was recognized with the UGA Foundation's Distinguished Service Award in 2025.

OPENING REMARKS · 9:00 AM

Institutional Welcome

KS

Keivan Stassun

Incoming Department Head & Stevenson Professor of Physics and Astronomy
Vanderbilt University; joining UGA January 2027

Keivan Stassun is an astrophysicist and observational astronomer whose research spans stellar astrophysics, exoplanet characterization, and the physics of young stars and brown dwarfs. He has led large-scale sky surveys and served on numerous national committees shaping the future of astronomy, including the Astro2020 Decadal Survey. At Vanderbilt he has built one of the nation's most successful programs for broadening participation in STEM, and his research group has produced an exceptional cohort of PhDs who now hold positions across academia, national laboratories, and industry.

As incoming Department Head, Stassun conceived and organized CSP Futures as the first act of a broader renewal of UGA's Department of Physics and Astronomy — bringing together the department's research community, philanthropic supporters, and national scientific leaders to collectively shape what the CSP becomes in its next chapter.

WELCOME, FRAMING & CSP RETROSPECTIVE · 9:05 AM · CLOSING REMARKS · 4:35 PM

Welcome, Framing, and Synthesis

DL

David P. Landau

Founding Director, Center for Simulational Physics
Distinguished Research Professor of Physics, University of Georgia

David Landau founded the Center for Simulational Physics in 1986 and led it for nearly four decades, building it from a small research group into one of the most internationally recognized centers for computational physics in the world. His own research contributions — including the Wang-Landau algorithm for flat-histogram Monte Carlo sampling, now used by researchers worldwide — have fundamentally shaped the methodological landscape of the field. He served as Chair of the IUPAP

Commission on Computational Physics and as Chair-Elect and Chair of the US Liaison Committee between the National Academy and IUPAP.

HONORED FOUNDER · PRESENT THROUGHOUT THE DAY

CSP retrospective material provided by Professor Landau and presented by the incoming department head

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AM

Andrew Millis

Managing Director, Flatiron Institute
Co-Director, Center for Computational Quantum Physics
Professor of Physics, Columbia University

Andrew Millis is one of the world's foremost theoretical condensed matter physicists and a central figure in the computational quantum materials revolution. A co-inventor of continuous-time quantum Monte Carlo methods, his research has fundamentally advanced our understanding of strongly correlated electron systems, quantum phase transitions, and the interplay of quantum mechanics and emergent phenomena in materials.

As Managing Director of the Flatiron Institute — the Simons Foundation's in-house research institute spanning computational astrophysics, quantum physics, neuroscience, biophysics, and mathematics — and co-director of the Center for Computational Quantum Physics (CCQ), Millis has helped build one of the most ambitious computational science ecosystems in the world. He delivered the Chhabra-Landau Distinguished Lecture at UGA in 2022.

KEYNOTE & FIRESIDE CONVERSATION · 9:20 AM

Where Is Computational Science Heading — and What Do Great Centers Do?

CSP FACULTY PRESENTERS

KS

Kamber Schwarz

Assistant Professor of Astronomy · Joining UGA Fall 2026
Previously: NASA Sagan Fellow; Postdoctoral Researcher, MPIA Heidelberg

Kamber Schwarz is an observational and computational astrophysicist whose research focuses on protoplanetary disk chemistry, volatile inventories during planet formation, and the molecular environments of young stellar objects. A NASA Sagan Fellow and lead contributor to the MAPS and AGE-PRO ALMA Large Programs and the JWST MINDS survey, her work combines high-resolution radio and infrared

observations with sophisticated chemical models to trace the origins of planetary systems — including the building blocks of habitability.

PRESENTATION · 10:15 AM

What the CSP's New Direction Means for My Research

CH

Cassandra Hall

Assistant Professor of Physics and Astronomy · UGA Department of Physics and Astronomy

Cassandra Hall is a computational astrophysicist whose research focuses on the formation of planetary systems through the gravitational instability mechanism — the process by which massive protoplanetary disks fragment directly to form giant planets and brown dwarfs. Her group uses hydrodynamic simulation, machine learning, and kinematic analysis of ALMA observations to probe the dynamics of planet-forming disks, including the landmark detection of gravitational instability signatures in the disk around AB Aurigae, published in ***Nature***. She holds NRAO Student Observing Support grants and an NSF award for deep computer vision in the astrophysics of planet formation (DECIPHER).

Together with André Erpenbeck, Hall organized the fall 2026 colloquium series on simulation at the frontier that served as the intellectual lead-up to today's symposium — a collaboration that itself embodies the CSP's new direction: quantum materials and astrophysics in genuine dialogue.

EMERGING FRONTIERS I · 10:50 AM

Astrophysical Simulation: Disks, Planets, and the Gravitational Frontier

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YA

Yohannes Abate

Associate Professor of Physics and Astronomy · UGA Department of Physics and Astronomy

Yohannes Abate is an experimental physicist specializing in nanoscale optical and quantum phenomena, with a particular focus on quantum materials and memristive devices. His group uses scattering-type scanning near-field optical microscopy (s-SNOM) and related techniques to probe materials at the nanoscale — including landmark work on carrier localization in perovskite nickelates and infrared nanoimaging of hydrogenated nickelate memristive devices. His long-standing collaboration with David Landau and the CSP on quantum materials represents a model of simulation-experiment integration that the CSP's next chapter will build upon.

EMERGING FRONTIERS III · 12:35 PM

Quantum Simulation and Quantum Materials: Where Simulation Meets Experiment

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PD

Prashant Doshi

Professor, School of Computing · University of Georgia
UGA Institute for Artificial Intelligence

Prashant Doshi is a Professor of Computer Science at the University of Georgia and a leading researcher in artificial intelligence, with particular expertise in sequential decision-making under uncertainty, multi-agent systems, and probabilistic planning. His research bridges theoretical AI and practical applications, including work on reinforcement learning and Bayesian inference frameworks that are increasingly relevant to physics-informed machine learning and simulation-driven discovery. He is affiliated with the UGA Artificial Intelligence Institute, which brings together UGA's interdisciplinary AI research community.

EMERGING FRONTIERS II · 12:05 PM

AI and the Future of Simulation

CSP ALUMNI — DISCUSSANTS

YL

Ying Wai Li (tentative)

Team Leader, Computer, Computational and Statistical Sciences Division · Los Alamos National Laboratory
Adjunct Faculty, UGA Department of Physics and Astronomy · PhD, UGA Center for Simulational Physics

Ying Wai Li completed her PhD at the CSP under David Landau, developing state-of-the-art Wang-Landau and replica-exchange Monte Carlo algorithms. After positions at Oak Ridge National Laboratory she joined Los Alamos, where she leads a team working on Monte Carlo methods, first-principles simulations, machine learning for materials science, and high-performance computing. She has given invited talks at the CSP Annual Workshop and international conferences on ML and materials, and holds 81 publications with over 2,100 citations. The Anderson-Pioletti and Cummings Award winner, she also received both the Graduate School Excellence in Research Award and the Robert C. Anderson Memorial Award from the UGA Vice President for Research. She remains an Adjunct Faculty member in the UGA Department of Physics and Astronomy.

DISCUSSANT — EMERGING FRONTIERS II · 12:05 PM

AI and the Future of Simulation

SH

Steven Hancock (tentative)

Johns Hopkins Applied Physics Laboratory
PhD, UGA Center for Simulational Physics

Steven Hancock completed his PhD at the CSP, where his simulations on quantum materials formed the computational bridge to Yohannes Abate's experimental program — work that produced landmark publications in PNAS, ACS Nano, and Physical Review Materials. His doctoral research exemplifies the CSP's most distinctive contribution: simulation science that directly enables experimental discovery. He is now a researcher at the Johns Hopkins Applied Physics Laboratory, where he continues work at the intersection of computational and applied physics.

DISCUSSANT — EMERGING FRONTIERS III · 12:35 PM

Quantum Simulation and Quantum Materials: Where Simulation Meets Experiment

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JT

Jason Terry (tentative)

Postdoctoral Researcher, University of Oxford
PhD, UGA Department of Physics and Astronomy

Jason Terry completed his PhD in astrophysics at the University of Georgia under Cassandra Hall, where he pioneered the use of machine learning to detect forming exoplanets in ALMA protoplanetary disk data. His approach — trained entirely on simulation-generated synthetic images and then applied to real ALMA observations — demonstrated for the first time that AI could make original astronomical discoveries in planet-forming systems, leading to the identification of a previously unknown embedded planet in an archival dataset. He is currently a postdoctoral researcher in astrophysics at the University of Oxford.

DISCUSSANT — EMERGING FRONTIERS I · 11:35 AM

Astrophysical Simulation: Disks, Planets, and the Gravitational Frontier

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AE

André Erpenbeck

Assistant Professor of Physics · UGA Department of Physics and Astronomy
Faculty Organizer, CSP Futures

André Erpenbeck is a theoretical and computational physicist specializing in nonequilibrium quantum many-body systems and strongly correlated materials. His research develops and applies advanced numerical methods — including quantum

Monte Carlo, tensor network approaches, and machine learning — to understand emergent phenomena in complex quantum systems. His recent work on AI-driven hybrid quantum-classical workflows places him at the intersection of the CSP's Monte Carlo heritage and the frontier of AI-augmented simulation science.

Together with Cassandra Hall, Erpenbeck organized the fall 2026 colloquium series on simulation at the frontier that served as the intellectual lead-up to today's symposium. As on-the-ground faculty lead for CSP Futures, he has played a central role in shaping the program, building the community of participants, and ensuring that the event reflects the full breadth and ambition of the CSP's next chapter.

> PRESENTATION · 10:23 AM
>
> *A New Faculty Member's Perspective on the CSP*

ACKNOWLEDGMENTS

CSP Futures is made possible by the generosity and vision of Ashvin and Daniela Chhabra, whose enduring investment in the Department of Physics and Astronomy — through the Chhabra-Landau Distinguished Lectureship, the Ashvin B. Chhabra Distinguished Department Head, and the Daniela and Ashvin Chhabra Professorship — has been transformative. Their commitment to catalyzing the CSP's next chapter reflects a rare alignment of scientific passion and philanthropic leadership.

We are grateful to the Franklin College of Arts and Sciences and the University of Georgia for their institutional support and deep investment in this moment of renewal.

We thank David Landau, founding CSP Director, for forty years of extraordinary leadership — and for his enthusiastic participation in shaping what comes next.

ORGANIZING COMMITTEE

Keivan Stassun — Incoming Department Head

André Erpenbeck — Faculty Organizer

Cassandra Hall — Assistant Professor of Physics and Astronomy

Phillip Stancil — Department Head & CSP Director

David Landau — Founding CSP Director — whose four decades of leadership made this day possible

Craig Wiegert — Associate Department Head

ACCOMMODATIONS

A room block has been reserved at the **Holiday Inn Express Athens – University Area** (513 West Broad Street, Athens, GA), approximately one mile from the Georgia Center. The group rate is **$214/night** for the nights of November 5 and/or November 6, 2026. Rooms must be reserved by **October 6, 2026**. Booking details are available at the event webpage: *tinyurl.com/csp-futures-2026* — or use the hotel direct booking link at *tinyurl.com/csp-futures-hotel*

WITH SPECIAL THANKS TO

Ron Walcott — Interim Provost, University of Georgia

Neil Lyall — Associate Dean, Franklin College of Arts and Sciences

Leslie Morrow & Simon Beckham — Georgia Center for Continuing Education