

American Physical Society Presents



QUANTUM VOYAGES

An original performance piece by

Smitha Vishveshwara and Latrelle Bright

(In collaboration with a Quantum Cast, Crew, and Guest Physicists)

Wednesday, March 6th, 2019 8PM

Westin Boston Waterfront
Commonwealth Room



QUANTUM VOYAGES

Creative & Scientific Director - Smitha Vishveshwara

Performance Director - Latrelle Bright

Original Script by Smitha Vishveshwara and Latrelle Bright

With guest appearances by physicists

David Campbell • Nadya Mason

Yanting Teng • Dale J. Van Harlingen

CAST

Akash

Sapienza

Terra

Quantum Ensemble

Michael Highman

Kalan Benbow

Gloria Lee

Daniel Inafuku

Lily Newton

Gabriel Ortiz

Tay Roylance

Astha Sethi

Ethan Soloman

Production Stage Manager

Company Manager

Projections

Music and Sound

Costumes

Original Art Work

Maddie Martín

Janice Benner

Tianshu Zhao

Charles Busse

Yuhui Cassie Zhao

Danielle Markovich



Quantum Voyages – Premiere March 2018

PRODUCED BY

Brian Schwartz • Smitha Vishveshwara

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 - Phys 498 Art – Where Art Meets Physics

SPECIAL THANKS

- Matthias Grosse Perdekamp • Rebecca McDuffee
- Rebecca Wiltfong • Will Wheeler
 - Vinaya Sathyasheelappa

SYNOPSIS

Guided by Sapienza, the spirit of knowledge, two voyagers enter the microscopic realm of atomic landscapes and quantum conundrums to discover a magnificent and baffling world foreign to every day human experience. As in epic adventures and mythical narratives – say, *Metamorphoses* or *The Nutcracker*—the voyagers explore land after land, each tickling the viewer’s imagination and, unlike myths, offering glimpses of a world we believe actually resides around us. The trio confront terrifying prospects of being Dead and Alive at once, encounter electrons acting as waves, are pelleted by photons, glide through diaphanous orbitals of atoms, precess in magnetic resonant imaging machines, levitate above superconducting surfaces, and navigate disordered quantum terrains within complex materials. The two voyagers emerge awakened to the miniscule landscapes within us and to the affirmation that things are never what they seem.

Scene 1: Photons: Wide Awake – What Does it Mean to See?

Scene 2: Quantum Conundrums and Superposition; Here AND There – Get a Clue

Scene 3: Bose-Einstein Condensation; The State of Friendship

Scene 4: Atomic Landscapes; Frenemies

Scene 5: Superconductivity; Finding Harmony

Scene 6: Exotic Phases of Matter; Lose Yourself

Scene 7: MRI; Probing the Brain

CAST

Kalan Benbow (Sapienza) is reprising her role as Sapienza. She has a BFA in Theatre History and Dramaturgy from the University of Arizona and is currently pursuing a career in Education. She has acted in, directed, and served as the dramaturge on many projects, but this is the only one about Quantum Physics.

Michael Highman (Akash) is a second-year physics PhD student at the University of Illinois at Urbana-Champaign. His current work, in the group of Bryce Gadway, is designing and building an apparatus for making ultracold sodium-rubidium molecules. In the spring of 2018 Michael was awarded the National Science Foundation's Graduate Research Fellowship. When not doing physics, Michael can be found watching hockey, reading fantasy books, or running.

Daniel Inafuku (Quantum Ensemble) is a 4th year PhD student in physics at the University of Illinois at Urbana-Champaign. He received his undergraduate degree in physics and mathematics at the University of Hawai'i at Manoa. His current research discipline lies at the intersection of mathematical physics, mathematical biology, and theoretical computer science.

Gloria Lee (Terra) is a physics graduate student at the University of Illinois at Urbana-Champaign. She conducts experimental biophysics research and quantifies evolution by observing the behavior of 'jumping genes'. She is grateful for the opportunity to participate in 'Quantum Voyages', and hopes fellow sojourners will leave the show with a sense of awe at the beauty and wonder of quantum mechanics.

Lily Newton (Quantum Ensemble/Schrödinger) is a junior majoring in acting at the University of Illinois. She has recently appeared in an all-female production of *All the Kings Men*, as well as *The Yellow Wallpaper*, and *The Assassination...Marat/Sade*. She writes and performs sketch and standup comedy and has taken classes and performed at The Second City Training Center.

CREATIVE TEAM

Latrellle Bright (Performance Director & Playwright) is a freelance theatre maker and arts advocate. She has served as founding artistic director of The Renaissance Guild Theatre Company and has worked with Voices of the South in Memphis, the Heifer Theatre Project with Heifer International in Little Rock and INNER VOICES Social Issues Theatre (University of Illinois). She is currently an artist-in-residence at the Urbana Dance Company, curating Performance Studio: a storytelling playground. She has received awards for her innovative programming, writing and directing and has been recognized as a Young Leader of Color by TCG. Recent directing credits include Fun Home, The Water Project and Sleep Deprivation Chamber.

Smitha Vishveshwara (Creative and Scientific Director, Playwright, and Quantum Sage) is an Associate Professor of Physics at the University of Illinois at Urbana-Champaign. She is a theoretical condensed matter physicist whose research spans studies of superconductivity, topological materials, non-equilibrium dynamics, connections to cold atomic gases, and more. Recognitions of her work include a Simons Fellowship and the National Science Foundation's American Competitiveness and Innovations award. In recent years, she not only applies condensed matter concepts to studies of black holes and proteins in interdisciplinary work, she also brings together her passions for physics, the arts, and public engagement, including in her project-based course, *Where the Arts Meets Physics*. She is elated to have created Quantum Voyages with theater maker, Latrelle Bright, and to bring it with their several collaborators as a public event to this APS March meeting.

PRODUCTION TEAM

Janice Benner (Company Manager) graduated from Eastern Illinois University with a BA in Graphic Design. In 2005, she started at the University of Illinois at Urbana-Champaign as an Office Support Associate. In June of 2012, Janice moved to the Physics Department serving as an Office Manager. In 2014, she took over for the Office Administrator of the Institute for Condensed Matter Theory. When not in the office, she enjoys crocheting, baking and candy making.

Maddie Martín (Production Stage Manager) is graduating with a degree in Theatre with a concentration in Stage Management from the University of Illinois at Urbana-Champaign this upcoming May. In her time at UIUC, she has served as the Production Stage Manager, Stage Manager, and Assistant Stage Manager on over 20 productions. Maddie looks forward to graduating and hopes to work in coordinating festivals and events in the future.

Tianshu Zhao (Projection Designer) does multi-platform visual experience design, including theatre, video, installation, and AR/VR technology. In theatre, she designs and directs. Selected NYC theatre credits: Sign in the Six O'clock Sky (lighting & projection), Appointment with Death (projection), Flying Tiger Flying Away (lighting & projection), Lost & Found (directing & lighting), etc.

Gabriel Ortiz (Quantum Ensemble) is a Freshman acting major at the University of Illinois at Urbana-Champaign. As a new member of the Illinois Theatre Department, Gabriel looks forward to working with others in a professional and personal manner at the Krannert Center for Performing Arts. He has been seen before in *Mamma Mia* with Illini Student Musicals playing the Role of Harry Bright, and will also be in their upcoming show *Footloose*.

Tay Roylance (Quantum Ensemble) is a freshman in the Stage Management program at University of Illinois at Urbana-Champaign. She has a history of acting at her high school, Glenbard East, in Lombard, IL. She is thrilled to be able to bring science and theatre together in this production.

Astha Sethi (Quantum Ensemble) is pursuing a PhD in Physics (experimental condensed matter) from the University of Illinois at Urbana-Champaign. She would be graduating within a year and hopes to work towards a postdoctoral degree. She eventually wants to join as a faculty in the Physics department.

Ethan Solomon (Quantum Ensemble) is a Missourian who attends the University of Illinois as an Acting Major! He has performed in high school, community and professional theatre with roles such as Farquaad from *Shrek*, Peter from *Peter and the Starcatcher*, and made the world debut as Kenji in *The Wedding Present*. However, he has never taken a show anywhere out of the town where it originated and Ethan could not be more excited about it.

QUANTUM SAGES

(Physicists onstage sharing insights)

David Campbell (Quantum Sage) is Professor of Physics and Director of Physics Graduate Studies at Boston University, where he previously served also as Dean of Engineering and University Provost. He is a theoretical physicist best known for his work on nonlinear phenomena in physics, for which he shared the 2010 Julius Edgar Lilienfeld Prize from the APS. His current focus is on novel condensed matter systems, including strongly correlated electronic systems in reduced dimensions and ultra-cold atomic systems. His service to the APS includes leadership in the GSNP and his recent election as the Vice-Chair of the DCMP. In 2015-2016 he served as a Phi Beta Kappa Visiting Scholar and gave both technical seminars and public lectures at nine colleges and universities.

Brian DeMarco (Scene 3: Bose-Einstein – Original Sage Monologue) is Professor of Physics and Director of Physics Graduate Studies at Boston University, where he previously served also as Dean of Engineering and University Provost. He is a theoretical physicist best known for his work on nonlinear phenomena in physics, for which he shared the 2010 Julius Edgar Lilienfeld Prize from the APS. His current focus is on novel condensed matter systems, including strongly correlated electronic systems in reduced dimensions and ultra-cold atomic systems. His service to the APS includes leadership in the GSNP and his recent election as the Vice-Chair of the DCMP. In 2015-2016 he served as a Phi Beta Kappa Visiting Scholar and gave both technical seminars and public lectures at nine colleges and universities.

Virginia Lorenz (Scene 1: Photons – Original Sage Monologue) is an Associate Professor of Physics at the University of Illinois at Urbana-Champaign. Her past work has focused on measuring and modelling the transition from reversible to irreversible dephasing of electronic coherence in dense atomic vapors, as well as implementations of quantum memories in atomic and solid state systems. Her recent work combines experimental research in the areas of photonic quantum state generation, single-photon-level

spectroscopy, and optical magnetometry of spin-orbit interactions in heavy metal / ferromagnetic metal systems. Recognized in the Optical Society of America New Focus and by a JILA Special Service Award, her work transcends and brings together several sub-disciplines of physics.

Nadya Mason (Quantum Sage) is a professor of Physics at UIUC. A condensed matter experimentalist, Dr. Mason focuses on electron behavior in low-dimensional materials such as nanowires, graphene, and nano-structured superconductors. In addition to maintaining a rigorous research program and teaching, Dr. Mason works to increase diversity in the physical sciences. Dr. Mason was a recipient of the 2009 Denise Denton Emerging Leader Award, the 2012 Maria Goeppert Mayer Award of the American Physical Society (APS), and was named an APS Fellow in 2018. She is a former General Councilor of the APS and Chair of the APS Committee on Minorities, and currently serves as Director of the Illinois Materials Research Science and Engineering Center (I-MRSEC).

Yanting Teng (Quantum Sage) was formerly an undergrad at UIUC and now a physics graduate at Harvard, where she is currently excited to study quantum phase transitions. She is generally interested in the intersection of quantum information and condensed matter theory. In her free time, she enjoys rock-climbing both indoors and outdoors.

Dale J. Van Harlingen (Quantum Sage) is a Center for Advanced Study Professor of Physics and the Donald Biggar Willett Professor of Engineering at UIUC. He was the Head of the Department of Physics from 2006 to 2018, and is currently the Executive Associate Director of the Illinois Quantum Information Science and Technology Center. His research in experimental condensed matter physics focuses on superconductor and topological materials and devices, phase-sensitive Josephson measurements, and scanning probe microscopies. He is a Fellow of the American Physical Society and the American Academy for Arts and Sciences, and a member the National Academy of Sciences. He received Oliver E. Buckley Prize from the American Physical Society in 1998.