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Department of Physics News

2152 Hillside Rd.
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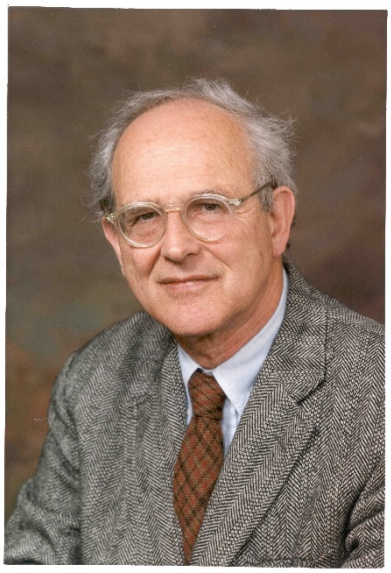
Professor Rainer Weiss
Katzenstein Distinguished Lecturer
Friday, October 26, 2018

The University of Connecticut's Department of Physics is proud to announce that on October 26, 2018, Professor Rainer Weiss of the Massachusetts Institute of Technology will be presenting the 2018 Distinguished Katzenstein Lecture, the twenty second in the series. In 2017 Professor Weiss shared the Nobel Prize in Physics with Professor Kip Thorne and Professor Barry Barish for their epochal discovery of gravitational waves, waves that had been predicted by Albert Einstein using his General Theory of Relativity no less than a hundred years before.

The title of Professor Weiss' talk will be "Exploration of the Universe with Gravitational Waves", with abstract:

The observations of gravitational waves from the merger of binary black holes and from a binary neutron star coalescence followed by a set of astronomical measurements is an example of investigating the universe by "multi-messenger" astronomy. Gravitational waves will allow us to observe phenomena we already know in new ways as well as to test General Relativity in the limit of strong gravitational interactions – the dynamics of massive bodies traveling at relativistic speeds in a highly curved space-time. Since the gravitational waves are due to accelerating masses while electromagnetic waves are caused by accelerating charges, it is reasonable to expect new classes of sources to be detected by gravitational waves as well. The lecture will start with some basic concepts of gravitational waves, briefly describe the instruments and the methods for data analysis that enable the measurement of gravitational wave strains of one part in 10 to the 21, and then present the results of recent runs. The lecture will end with a vision for the future of gravitational wave astrophysics and astronomy.



Professor Rainer Weiss received his BS degree from MIT in 1955 and his PhD from MIT in 1962. He was on the faculty of Tufts University from 1960 to 1962, and did post-doctoral research at Princeton from 1962 to 1964. He joined the MIT faculty in 1964 and remained a regular faculty member there until he became emeritus in 2001. Along with Kip Thorne, the late Ronald Drever and Barry Barish he spearheaded the development of LIGO, the Laser Interferometer Gravitational-Wave Observatory, a set of two interferometers, one located in Louisiana and the other in Washington State. The interferometers would jointly look for gravitational wave signals seen in coincidence, and in September 2015 made the very first detection of gravity waves. At Louisiana State University he has served as an Adjunct Professor of Physics since 2001. As well as research in gravity waves Professor Weiss' other primary interests are in atomic clocks and cosmic microwave background measurements.

Rainer Weiss has been recognized by numerous awards:

- In 2006, with John C. Mather, he and the COBE team received the Gruber Prize in Cosmology.
- In 2007, with Ronald Drever, he was awarded the Einstein Prize for this work.
- For the achievement of gravitational waves detection, in 2016 and 2017 he received:
  - The Special Breakthrough Prize in Fundamental Physics.

- Gruber Prize in Cosmology.
- Shaw Prize.
- Kavli Prize in Astrophysics.
- The Harvey Prize together with Kip Thorne and Ronald Drever.
- The *Smithsonian* magazine's American Ingenuity Award in the Physical Science category, with Kip Thorne and Barry Barish.
- The Willis E. Lamb Award for Laser Science and Quantum Optics, 2017.
- Princess of Asturias Award (2017) (jointly with Kip Thorne and Barry Barish).
- The Nobel Prize in Physics (2017) (jointly with Kip Thorne and Barry Barish).
- Fellowship of the Norwegian Academy of Science and Letters.

- In 2018, he was awarded the American Astronomical Society's Joseph Weber Award for Astronomical Instrumentation "for his invention of the interferometric gravitational-wave detector, which led to the first detection of long-predicted gravitational waves".

Takaaki Kajita, 2017 Katzenstein Distinguished Lecture

The Katzenstein Distinguished Lectures series continued in the 2017/2018 academic year with its twenty first Nobel Laureate lecturer, with a March 26, 2018 lecture by Professor Takaaki Kajita of the Institute for Cosmic Ray Research at the University of Tokyo.

March 26th Katzenstein Lecture

The title of Professor Kajita's lecture was "Oscillating Neutrinos" with abstract: Neutrinos have been assumed to have no mass. It was predicted that, if they have masses, they could change their type while they propagate. This phenomena is called neutrino oscillations. Neutrino oscillations was discovered by deep underground neutrino experiments. I will describe the discovery of neutrino oscillations and the implications of the small neutrino masses. The status and the future neutrino oscillation studies were also described.

Professor Takaaki Kajita received his doctorate in 1986 at the University of Tokyo. Since 1988 he has been at the Institute for Cosmic Radiation Research at the University of Tokyo, where he became an assistant professor in 1992 and professor in 1999.

He became director of the Center for Cosmic Neutrinos at the Institute for Cosmic Ray Research in 1999. As of 2015, he is at the Institute for the Physics and Mathematics of the Universe in Tokyo and Director of the Institute for Cosmic Ray Research.

In 1998, Professor Kajita's team at the Super-Kamiokande neutrino facility in Japan found that when cosmic rays hit the Earth's atmosphere, the resulting neutrinos switched between two flavors before they reached the detector buried under Mt. Kamioka. This discovery helped prove the existence of neutrino oscillations and show that neutrinos have mass.

In 2015, Professor Kajita shared the Nobel Prize in Physics with Canadian physicist Professor Arthur McDonald, whose group at the Sudbury Neutrino Observatory discovered similar results. The work of Professors Kajita and McDonald solved the longstanding solar neutrino problem, which was a major discrepancy between the predicted and measured solar neutrino fluxes, and indicated that the standard model of elementary particle physics, which assumed neutrinos to be massless, had weaknesses. In a news conference at the University of Tokyo, shortly after the Nobel announcement, Professor Kajita said, "I want to thank the neutrinos, of course. And since neutrinos are created by cosmic rays, I want to thank them, too". Professor Kajita is currently the principal investigator of another Institute for Cosmic Ray Research project located at the Kamioka Observatory, the KAGRA gravity wave detector.

Professor Kajita has received numerous awards including: The Asahi Prize 1987; The Bruno Rossi Prize 1989; The Asahi Prize 1998; The Nishina Memorial Prize 1999; The Panofsky Prize 2002; The Yoji Totsuka Award 2010; The Japan Academy Prize 2012; The Julius Wess Award 2013; The Nobel Prize in Physics 2015; The Fundamental Physics Prize 2016.

A video of Professor Kajita's Katzenstein lecture may be found at https://youtu.be/u20dJ38U6IY

The 2017 Edward Pollack Memorial Lecture

The annual Edward Pollack Memorial Distinguished Lecture was delivered on October 20, 2017 by Matthias Weidemueller of the University of Heidelberg. The Pollack Lectures are funded by an endowment generously established by the family and friends of the late Prof. Edward Pollack. They bring to the Department a distinguished speaker to talk on a topic related to experimental, atomic, molecular and optical (AMO) physics, which was Prof. Pollack's main research interest, or to undergraduate physics teaching, to which he devoted more than 40 successful years. Prof. Pollack began as an UConn faculty member in the early 1960's, after earning his Ph.D. at NYU under Prof. Benjamin Bederson. Prior to that, Ed had served in the U.S. Army and had taught physics at both NYU and the City College of New York, his alma mater. For years, Ed was a mainstay of our Department, having taught most of the undergraduate courses while maintaining an active and successful research program in experimental atomic and molecular collisions, with DOD and NSF support. He was a fellow of the American Physical Society.

Prof. Weidemueller's talk was on "Taming Atomic Giants: How Rydberg Atoms Became Veritable Quantum Simulators." He described how these unusual atomic systems, where the valence electron lives at a large distance from the nucleus, can interact strongly with each other, even when the atoms are quite far apart. These interactions in ultracold ensembles allow for many-body systems, such as magnetic materials and light-harvesting complexes, to be simulated at the quantum level. His talk was well received and overlapped with the interests of several research groups at UConn, particularly those in AMO physics.

Prof. Weidemueller is truly an international scientist – his primary appointment is in Germany, at the Physics Institute and Heidelberg Center for Quantum Dynamics at the University of Heidelberg, but he also leads a group at the Hefei National Institute for Physical Sciences at the Microscale at the University of Science and Technology of China. He is an expert in several areas of AMO physics: ultracold Rydberg atoms; ultracold molecules; and ion-atom interactions, the latter being a research direction which was also of interest to the late Prof. Pollack. Of

note is the fact that, as a graduate student, Prof. Weidemueller worked with two Nobel Laureates in Physics: Serge Haroche (2012) and Ted Haensch (2005).

Previous Pollack Lecturers include – **2016**: Thomas Gallagher, Jesse W. Beams Professor of Physics at the University of Virginia; **2015**: Deborah Jin, MacArthur Fellow and Professor at JILA and the University of Colorado; **2014**: David Pritchard, Cecil and Ida Green Professor of Physics at MIT; **2011**: Michael Drewsen, University of Aarhus in Denmark; **2010**: Thomas Cravens, University of Kansas; **2008**: Claude Cohen-Tannoudji (Nobel Laureate), College de France and Ecole Normale Superieure in Paris; **2007**: Ara Chutjian, Jet Propulsion Laboratory at the California Institute of Technology; and **2006**: Lew Cocke, Kansas State University. This series of outstanding lectures has not only honored the legacy of Prof. Pollack, but also brought some of the world's top AMO scientists to UConn for productive exchanges.

2017 Charles Reynolds Lecture

The annual Reynolds Lecture is held in honor of the late UConn Professor Charles Reynolds, a co-discoverer of the isotope effect. The 2017 Reynold's lecture "Exploring Materials Universes" was delivered on December 1st by Dr. Suchitra Sebastian from the Cavendish Laboratory, Cambridge University, UK. Dr. Sebastian is an expert in a number of experimental techniques, including materials synthesis and transport measurements in high magnetic fields. She has received many honors and is widely considered a rising star in condensed matter physics research related to strongly correlated electron systems, wherein complex interactions between electrons drive magnetism, superconductivity, nontrivial electronic topology, and other cooperative phenomena. Dr. Sebastian has been distinguished by the Lee Osheroff Richardson North American Science prize, the Young Scientist Medal in Magnetism (International Union of Pure and Applied Physics), the Moseley Medal (Institute of Physics), the L'Oréal-UNESCO Awards for Women in Science, the Philip Leverhulme Prize and the Brian Pippard Prize for her achievements in superconductivity research.

Materials comprise trillions of electrons that interact with each other to create a diversity of physical behaviors. We owe much of modern technology - from powerful computing to the marvels of communication - to discoveries of new types of collective electron behaviors in materials. Such discoveries, however, are often serendipitous, given that materials can be thought of as complex universes teeming with vast numbers of electrons, making their behaviors challenging to understand or predict. A question we are often confronted with is how to make progress in discovering novel collective electron behaviors akin to new universes. Dr. Sebastian discussed possible approaches to increasing the odds of making discoveries, with examples from cases such as new superconductors and new types of dual metal-insulating materials.

Sigma Pi Sigma Honor Society and the Undergraduate Program

This year's Sigma Pi Sigma Honor Society lecture and banquet were held on April 27th. The lecture was given by our colleague Professor Gerald Dunne on ``Stephen Hawking: His Life and His Physics" to commemorate the passing this year of Professor Hawking. Dunne gave a spectacular talk to a packed audience in P38. In fact, several eyewitnesses claimed it was the largest audience ever for a SPS lecture with friends, family, and science fans turning out in huge numbers.

Of course the reason for the lecture was the induction of new members into the honor society. Our pool of majors continue to improve academically, and this year we admitted twelve inductees: **Jonah Cerbin**, **Huifeng Chen**, **Chrystina Christodoulous**, **Sam Cutler**, **Jacob Franklin**, **Harrison Hall**, **Mark Johnson**, **Chengzhang Li**, **Brenna Robertson**, **Richard Sadlon**, **Meagan Sundstrom**, and **Eric Vicklund** while making the academic criteria even more stringent. Congratulations to our new SPS members! The banquet was held again in the Pharmacy Building's Joseph A. Morosko Student Lounge. Family, friends, and faculty joined the new inductees for dinner. Afterwards, a ceremony was emceed by Professor Barret Wells, and assisted by Professor Thomas Blum. The event was staged and managed by Undergraduate Physics Advisor Micki Bellamy, who was surprised (in a good way) by Department Head Nora Berrah who presented framed certificate of appreciation signed by the undergrads.

Prior to the lecture, undergrad achievements and honors were announced to the audience. **Connor Occhialini** was awarded the annual Katzenstein Prize for the best paper by a graduating senior (Connor has since been named as an Apker Award Finalist in the American Physical Society's competition for best paper by an undergrad). **Jonah Cerbin** was the 2017 Mark Miller Award winner. **Nikko Cleri**, **Rochelle Horanzy**, and **Aisha Massiah** were awarded NSF Research Experience for Undergrads (REU) awards for this past summer to do physics research at institutions around the country. **Tyler Metivier** has been awarded the NASA CT Space Grant Undergraduate Research Fellowship performed research at UConn this past summer. **Edward McManus** has been named a 2018 Holster Scholar. **Emerson Dang** and **Sam Markelon** were both awarded UConn IDEA grants. Sam had a summer research internship at IPN-Orsay, France funded by NSF-IRES program. **Stephen Moores** was accepted for the study abroad program at University College Dublin. **Emerson Dang** and **Meagan Sundstrom** have been selected as 2018 University Scholars, the highest academic honor awarded by UConn. **Hope Whitelock** received a NSF Graduate Research Fellowship. Six physics majors have been inducted into Phi Beta Kappa: **Meagan Sundstrom**, **Emerson Dang**, **Matthew Ennis**, **Mark Johnson**, **Christopher Oldham**, and **Fernando Rodrigues**. Finally, the following graduating majors are headed to graduate school: **Mohammad Ashas** (Cal State Long Beach, physics masters), **Daniel Kovner** (College of William and Mary, physics Ph.D.), **Connor Occhialini** (MIT, physics Ph.D.), **Sadhana Suresh** (Univ. of Chicago, physics masters), and **Hope Whitelock** (Univ. of Colorado, physics Ph.D.).

2017-2018 Graduate Updates and News

Programmatic Innovations are continuing*: 1)** A PhD progress timeline goal document is required for each student and advisor; ***2) A Teaching Mentoring Program, for graduating PhD students intending to pursue a teaching career at the College level is provided for our students. ***3)*** The evaluation of the Dissertation Proposal by the end of the student's third year is imposed on students in order for them to continue in the PhD program.

Our recent Ph.D. graduates from the Physics Department have begun promising careers. **Shiqi Yin** has begun a career as Research Staff at Global Foundries at Albany, NY. **Xiang Zhang** is a Senior Research Engineer at CGG Corp. at Houston, TX. **Sanka Piyadasa** has accepted a postdoctoral fellowship at University of Connecticut. **Anees Ahmed** is pursuing a Research Opportunity in Japan, **Ekaterina Sergan**, **Jonathan Hudson, Yiteng Tian, Fridah Mokaya, Scott Galica,** and**, Di Shu,** are pursuing postdoctoral opportunities, **Sahan Handunkanda** has a postdoctoral opportunity at a National Laboratory. **Dale Smith** and **Udaya Dahal** planned to have graduated in Summer 2018.

Benjamin Commeau has received a prestigious US DOE SGSRC fellowship for one year to work at Los Alamos. **Candost Akkaya** gave a talk at the high energy seminar in UTSFM, Valparaiso, Chile. **Razib Obaid** spent six months

at SLAC National Laboratory as part of his PhD training. **Sunil Thapa** gave a talk at the Connecticut Microelectronics and Optoelectronics Meeting on “Two-Photon based PRBS generation in Quantum Dots”. **Deran Schweitzer** gave a talk at a Collaboration Meeting in Warsaw on “Update on MAXWELL Simulations”. Also he had a poster in National Nuclear Physics Summer School at Yale University. **Sarah Stern** had a poster in National Nuclear Physics Summer School at Yale University. **H Perry Hatchfield** visited the Zentrum für Astronomie at the University of Heidelberg for a month this past summer as a visiting researcher. **Donal Sheets** gave a poster presentation at NSLS-II User Meeting. **Freddy Obrecht** gave a talk on "Asymmetry Measurement of the Electric Form Factor of the Neutron" in APS April Meeting, and, on "Double Polarization Asymmetry Measurement of the Electric Form Factor of the Neutron at Q^2 = 1.16 GeV^2" at the Fall Meeting of the Division of Nuclear Physics of the APS. He also gave two other talks on Jefferson Lab collaborations. **Yasaman Homayouni** and Professor Jon Trump were scheduled for telescope time through the National Optical Astronomy Observatory (NOAO) from February-July 2018. **Hari Sharma** presented a paper on “Gold nanoparticle self-assembly in mixed lipid nanodiscs: Molecular dynamics simulations” at the 254th ACS National Meeting. His paper was selected as the “Best presentation of the session” He also presented a poster at the same conference. **Udaya Dahal** presented a paper on “Spontaneous insertion and helix formation by polyethylene oxide in carbon nanotubes”, at the ACS Meeting. **Erin Curry, Benjamin Commeau, Sahan Handunkanda,** and**, Donal Sheets**, gave talks at the March APS meeting.

In Memoriam, George Rawitscher: 1928-2018

It is with great sorrow that we report the passing of our long-time colleague and friend, George Rawitscher on March 10, 2018, after a brief illness and just having passed his 90th birthday, which was celebrated with a cake at a meeting of the UConn Physics Department. George was born in 1928 in Germany, where his father was a distinguished Professor of Botany at The University of Freiburg.

In 1934 his father, Felix Rawitscher who was Jewish, brought his family which included George’s mother, Charlotte Oberlander, his sister Erika, and George from Germany to Brazil to escape the Nazis. In Brazil, Felix established and chaired the Botany Department, which still bears his name, at the University of Sao Paulo. George grew up in Sao Paulo, where he learned fluent Portuguese. From an early age he knew he wanted to be a physicist, and taught himself quantum mechanics from a book during high school. He graduated in physics and mathematics from the University of Sao Paulo in 1949, and he served as an Instructor at the Brazilian Center for Physical Research in Rio de Janiero for two years, receiving a Brazilian National Research Council Fellowship. While he was in the Center for Physical Research at Rio, he worked under Richard Feynman who was a visiting professor at the same institute. He told his grandson Nicholas that Feynman had made a big mark on his life, inspiring his approach to physics, and observing that he had the potential to become a “real” physicist, which he remained until the end of his life.

Following his time in Rio, George went to Stanford University as a graduate student in theoretical nuclear physics and mathematics. He received his Ph.D. in 1956, for a study of Fierz-Pauli spin 3/2 particles and the anomalous magnetic moment of the muon under Profs. Leonard Schiff and D.R. Yennie. His first paper had to do with the effect of the finite size of the nucleus on muon pair production by gamma rays. While at Stanford, George met and later married Mary Adams, a fellow Stanford student, and they proudly raised two sons, Peter and Henry. Mary, a biochemist, died in 1980. In his later years, George was again happily married to Joyce Rawitscher in 2009, who passed away in 2016.

George and his wife Joyce at the SPS Banquet in 2016

Following his graduate work, George became an Instructor at the Physics Nuclear Structure Center (University of Rochester) for two years and then joined the Physics Department at Yale as Instructor, doing research in collaboration with Prof. Gregory Breit. He remained at Yale as Assistant Prof. of Physics until 1964. He joined the Physics Department at the University of Connecticut in Storrs as an Associate Professor and then became Professor of Physics from 1972. He retired in 2009 but remained at UConn as an emeritus Research Professor until days before his death, continuing to do active research in nuclear physics, computational physics and ultracold atomic collision physics until his final days.

Prof. Rawitscher received several prestigious academic honors including one of the early Research Fellowship awards from the Alexander von Humboldt Foundation (Germany) in 1964 and became a Fellow of the American Physical Society, nominated by the Division of Nuclear Physics in 2016.

During his tenure at the University of Connecticut, he took academic leaves at the Max Planck Institut fur Kernphysik in Heidelberg (1964-1966), the Laboratory for Nuclear Science at MIT (1972), as guest professor at the University of Surrey, England 1973, the University of Maryland (1987-1988) and served on the Board of Directors of Bates Users Theory Group at MIT (1982-1985) and the Executive Committee of the American Physical Society topical group on Few Body Systems and Multi-Particle Dynamics (1993-1995). He gave a number of invited presentations in nuclear theory at conferences, published approximately 88 refereed papers and numerous conference proceedings.

His principal research interests involved scattering problems using non-local optical models of nuclear processes, coupled-channel reaction mechanisms for nuclear break-up such as the (e,e'p) reaction, and virtual nuclear excitations. Recently he emphasized development of numerical methods such as Galerkin and spectral expansions for solving integral equations. He has applied some of these techniques to studies of ultracold atomic collisions as well as nuclear reactions. His most recent refereed papers (2015-2017) concerned "Revival of the Phase-Amplitude description of a Quantum-Mechanical wave function."

Professor Rawitscher was an engaged and untiring participant both in his Department and in the general community up to the last moments of his life. He promoted public awareness and activism on ameliorating the effects of global climate change and he and his wife Joyce have been active in the peace movement. He was a member of the Storrs, CT Quaker Meeting. He was also active in community service in the Storrs area, for example serving on the Town of Mansfield Sustainability Committee. Recently he has been working on a nearly-finished book summarizing his lifelong expertise in numerical computational physics, under contract with

Springer, with two younger colleagues from Brazil. George was a dedicated and effective undergraduate teacher and empathetic mentor to a large number of graduate students, colleagues and collaborators. George was a central member of the department for more than 50 years, and has earned a special place in our hearts forever. His inspiring presence and example will be very much missed at the University, amongst his family, friends, and the community, it was a great loss to see him go.

Ralph Snyder Remembrance

Ralph "Rand" Snyder passed away on Oct. 23, 2017 of complications from lymphoma treatment. Ralph was an Associate Professor of Physics at UConn and served at both the Storrs and West Hartford Campuses. Born into an Air Force family in Shreveport, La., Ralph moved frequently in his childhood, living in Japan and Korea before attending high school in Belleville, Ill. He majored in physics as an undergraduate student at Princeton and then earned his doctorate in theoretical astrophysics at Harvard under David Layzer, a well-known astrophysicist.

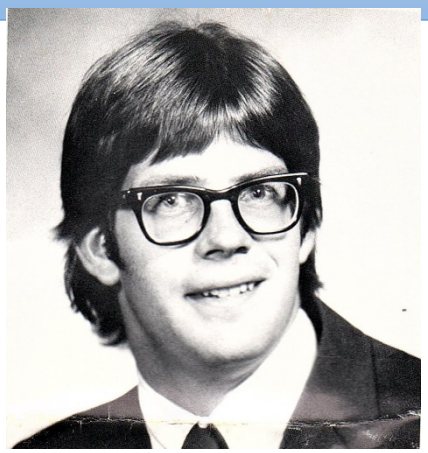
He joined the faculty here at UConn in 1977. Soon after his arrival, he began a fruitful multi-year collaboration on atomic collision theory with colleagues Arnold Russek and Edward Pollack, focusing on dissociation and differential energy loss studies of simple and basic three-body colliding atomic systems. His thesis physics research involved the theoretical structure of highly-ionized atoms, especially Z-expansion perturbation theory of relativistic effects.

Ralph had three children: Kenneth, Douglas, and Katherine, all of whom survive him along with his ex-wife Mary, and to all of whom the department extends its sympathies. He was an active member of the Storrs Quaker Meeting.

In Memory of Mark Vedder

M.S. '76, Ph.D. '80, age 65, Experimental Atomic & Molecular Physicist, passed away on April 2, 2018, of genetic heart disease. He survived his 1st open heart surgery to remove a thoracic aortic aneurysm 8 years ago, and needed a 2nd surgery in December 2017 to repair a mitral valve rupture. Under Professor Ed Pollack, Mark conducted fundamental studies of A & M collisions in the atmosphere. He continued on to William & Mary for his post-doc. After his post-doc, he went on to the Department of Defense, to work on hardening communications in Pres. Reagan's helicopter against nuclear EMP under the Star Wars program. He then spent 30 years at AT & T (Bell Labs) and was an active employee. He was the inventor of 3 patents. He worked in the "Digital services Lab" and was an expert in state of the art high capacity optical transport, as the world's demand for data grew. Post 9/11, Mark was called to the White House, to secure communications systems.

During Mark's UConn years, he was the pitcher for the Physics softball team. He also proudly did his own car repairs in the physics parking lot. Mark met and married his college girlfriend, Cathy, an R.N. They have a daughter and a son, 32 and 28. Mark kept in touch with his grad school buddies, and had a reunion at UConn when they all turned "50." Mark was a native of Long Island, loved the Giants, his electric guitar & amp, and



was never seen without his 'signature glasses.'

Boston University conducts studies on the brain, funded by the NFL. Mark requested to know if his brain had the "Einstein lobe" as he suffered a closed head injury at age 19 and CTE is also being studied. We await the findings of this scientific research for Mark.

Mark loved UConn's huge campus, after completing his undergrad at Stevens Tech. He was also a Beta Theta Pi Frat brother at UConn. Mark wrote a published letter to Physics Today/Oct '83, "The Value of a Physics Education."

Mark and Stephen Hawking passed away within 19 days of each other; we imagine that together they are exploring the multi-verses Stephen theorized about, with Mark reminding him that "it must be proven, so let's go do it!"

UConn's APS Bridge Program Partnership

The American Physical Society has established the APS Bridge Program (APSBP), whose purpose is to enhance diversity in graduate education in the US, and to "facilitate student transitions from undergraduate degree programs to graduate school" for underrepresented minority (URM) students. The APS Bridge Program provides a way for URM students to access graduate degree programs at institutions that have put in place specific initiatives that can provide for a more supportive student environment, and have demonstrated an enhanced commitment to improving the diversity of their graduate student populations. In 2014, The UConn Department of Physics became a membership institution in the APSBP, the first step in institutional participation in this nation-wide endeavor. The next level of participation in the APSBP is as a Partnership Institution, which provides early access to student applicants, as well as the possibility to apply for Partnership Grants from APS to support diversity and mentoring programs. To become a Partnership Institution, the department must demonstrate a high level of commitment to student support, including mentoring programs, practices that create a welcoming and nurturing environment for graduate students, and a strong commitment to enhancing diversity within the department. In 2016, the UConn Department of Physics began the application process to become and APSBP Partnership Institution by submitting an application proposal to APS. After review of that proposal, vetting of the Department's efforts in the area of diversity in graduate education, and meetings with APS representatives, the UConn Department of Physics was granted APSBP Partnership Institution status in 2017. Later that year our first APSBP applicant was admitted, and in 2018 one additional graduate student applicant has been accepted through the APSBP. The Department anticipates continuing to admit from one to two URM applicants through the APSBP in the future.

Dynamic Quantum Matter Workshop

Photo Credit: Adam Summers, Kansas State University

An international workshop on "Dynamic Quantum Matter" was organized and conducted by several members of the physics department and others in June 2018. The location was picturesque Newport, Rhode Island. Participants came from China, Japan, and Europe in addition to the United States. There were numerous, lively discussions on topics such as topological/correlated electronic states, superconductivity near critical points, novel experimental techniques probing condensed matter to name a few. The lead organizer of the workshop was Ilya Sochnikov, while Alexander Balatsky, Gayanath Fernando, and Jason Hancock provided crucial support. Several graduate students from UConn physics also helped to make this event a success. The funding sources for the workshop included DOE-BES/Institute for Materials Science-Los Alamos, NSF, Nordita (Sweden), Villum Center for Dirac Materials, Wiley, and UConn.

The BiteScis Program

The BiteScis program (https://bitescis.org) enjoyed its first year on a grant from the John Templeton Foundation at UConn this year, led by Prof. Cara Battersby in the physics department and science education colleagues Shannon Morey, Erica Kimmerling, and Stephanie Keep in Boston. BiteScis brings together K–12 educators with early-career science researchers to develop lesson plans that bring modern science research into the K–12 classroom.

These unique partnerships between educators and researchers are a symbiotic combination of expertise. The researchers are well-versed in the latest science, while the teachers know what works in a classroom and connect each lesson directly with curriculum standards. Additionally each lesson plan contains a brief bio and

photo of the educator and researcher authors, helping to expand students' vision of who a scientist can be. With each lesson plan freely available online in an easily searchable format, it easy for teachers everywhere to implement these cutting-edge, inspirational science lesson plans into their classrooms.

BiteScis hosted workshops in October 2017, pictured below, including UConn Physics PhD student H Perry Hatchfield, and March 2018. The team is looking forward to an exciting year completing these lesson plans and making plans to move the program forward.

BiteScis

Solar Eclipse

Photo courtesy of Jonathan Kwolek

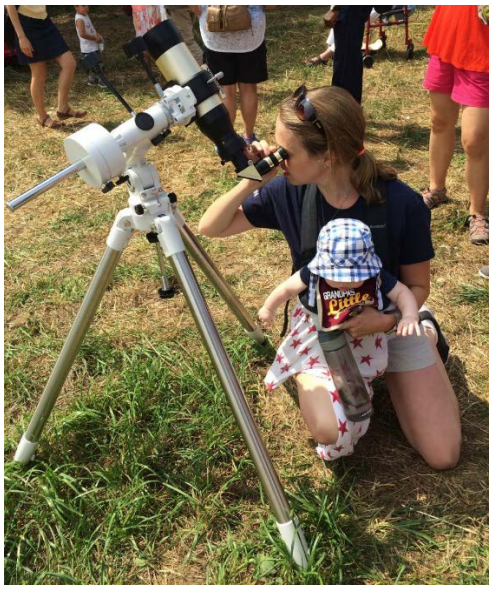
The solar eclipse of August 21, 2017, visible as a partial solar eclipse from Connecticut, was dubbed as the "Great American Eclipse" and awed spectators across the nation. The new astrophysics faculty at UConn (Kate Whitaker, Jon Trump, and Cara Battersby), aided by many physics graduate and undergraduate students, hosted a solar eclipse viewing party at Horsebarn Hill, next to the Dairy Bar. Meanwhile UConn sponsored 3 students to go to Talcott Mt Observatory for the eclipse to educate visitors at their viewing event.

The eclipse-viewing party started with tensions running high and eclipse-viewing glasses running low. The faculty anticipated no more than 75 attendees and felt very prepared with their seemingly massive collection of 150 solar eclipse-viewing glasses. To their short-term terror and long-term delight, the number of attendees was more than 10 times their wildest expectations, and the UConn eclipse viewing party hosted **over 2,000**[1] eager spectators of all ages.

Luckily, these physicists were prepared with tools for everyone to make their own pinhole camera (organized by the Physics Club led by Tyler Metivier), four solar observing telescopes to safely observe the sun in exquisite detail, and an important lesson on sharing of the solar eclipse-viewing glasses, ensuring that absolutely everyone got to safely witness this spectacular celestial event. On this hot late-summer day, custom ice cream milkshakes from the UConn Dairy Bar for the eclipse were a perfect complement to the eclipse viewing. Rounding off the day with 3 public lectures and demonstrations on what causes solar eclipses and a great sense of community, fun was had by all. Look out for April 8, 2024 for another (even better!) partial solar eclipse visible from Connecticut.

[1]http://www.courant.com/community/hartford/hc-eclipse-connecticut-main-20170818-story.html

Photo courtesy of Kate Whitaker /Dennis Bellamy. Physics students and faculty enjoying a well-earned rest after a successful solar eclipse viewing party at Horsebarn Hill



Right photo courtesy of Kate Whitaker. Assistant Professor Kate Whitaker (and son) views the eclipse through a solar telescope on Horsebarn Hill.

Left photo courtesy of Carrie Cichocki. Assistant Professor Cara Battersby teaching visitors to safely view the eclipse with a simple pinhole camera.

Right photo courtesy of Laina Hancock. Assistant Professor Jonathan Trump (and son) uses a reflecting telescope to project the partial eclipse for visitors.

Left photo courtesy of Laina Hancock. Former UConn Provost Jeremy Teitelbaum enjoying the eclipse with a cereal box pinhole camera, built in an activity led by undergraduate students in the Physics Club.

Diversity and Inclusion

Special Public lecture by Prof. Geraldine Richmond. http://richmondscience.uoregon.edu

The Physics Department hosted a public lecture on diversity and inclusion given by Prof. Geri Richmond from the University of Oregon. Geri's research uses laser spectroscopy and computational methods to understand environmentally and technologically important processes that occur at water, semiconductor and mineral surfaces. Geri is a member of the U.S. National Academy of Sciences, the American Academy of Arts and Sciences and is a Fellow of the American Chemical Society (ACS), the American Physical Society (APS) and the Association for the Advancement of Science (AAAS). Awards for her scientific accomplishments include the National Medal of Science from President Obama.

Geri is also the founder and director of COACh, a grassroots organization that has been assisting in the career advancement of women scientists around the globe since 1997. On Tuesday, November 28th 2017, she gave a presentation on "The Importance of Diversity and Inclusive Leadership in Research and Innovation". The event included the women center and the Office for Diversity and Inclusion. The lecture can be viewed here: https://www.youtube.com/watch?v=AO54ndVkjeE&feature=youtu.be

Physics Outreach Events

Departmental Outreach

During the '17 – '18 academic year Physics Department faculty, staff, and students have represented the Department at the Storrs campus, the depot campuses, and throughout the country. Members of the department have served as mentors, teachers, and advocates for science.

Andrew Puckett participated in Nuclear Physics Day on the Hill, visiting the US Senate in May of '17. As part of a group of three nuclear physicists from CT, he met with staff members in the office of Rep. Joe Courtney of the 2nd district in which the Storrs campus of UConn is located, as well as other CT representative offices. They also met with the offices of CT's US Senators Blumenthal and Murphy, discussing their work and the impact of federally funded nuclear physics research in CT.

Peter Schweitzer prepared the UConn Brochure for the APS Division of Nuclear Physics.

Keith Wood worked with an elementary teacher in North Carolina and skyped with sixth grade classes to answer questions about astronomy and physics through the Skype a Scientist program.

In April of this year, **Howard Winston** and six of his students showed how solar energy can be used to create hydrogen fuel from water, and how that hydrogen gas can generate electricity in a proton-exchange membrane (PEM) fuel cell with water being the only byproduct. The Environment Metanoia took place at the UConn Waterbury campus.

Graduate student **Yasaman Homayouni** worked with **Christopher Stewart** to help at the Eclipse event at Talcott Mountain Science Center and Academy. Yasaman also gave a talk about supermassive black holes for a science class at East Lyme HS in November and volunteered for "Huskies Forever" led by **Professor Jon Trump** taking UConn alumni to the observatory and using solar telescopes.

The Astronomy Club at Avery Point held several "telescope night observations" during the fall '17 semester. These were open to the public and were coordinated by **Moshe Gai** and graduate student **Sarah Stern**.

Faculty gave numerous talks throughout the academic year; **Kate Whitaker** gave a public lecture in July '17 on Observational Galaxy Formation and Evolution at the Westport Astronomical Society. **Richard Luddy** gave a physics presentation to 130 incoming freshmen for the UConn Hartford Head-Start program. Richard also gave physics demonstrations for prospective students at the UConn Hartford Open House, and then gave another presentation to accepted freshmen and their parents.

George Gibson hosted high school seniors from MacDuffie High School in January '18, giving them a tour of his lab.

Belter Ordaz spoke on a panel for the UConn Society of Hispanic Professional Engineers, an undergraduate student association, in December '17.

Diego Valente attended the 3rd Annual UConn STEM Night organized by the UCONN chapter of Engineering Ambassadors in November '17 at the Connecticut Science Center.

Nora Berrah conducted several outreach activities to increase the number of women in physics in the US, Europe and North Africa.

Dave Perry took his nitrogen show on the road, giving demonstrations at Guilford High School in October '17 and Andover Phillips Academy in December '17, as well as Williams Hall Middle School STEM Fest in May '18.

Cara Battersby also gave a public lecture on "Skyscrapers, the amateur astronomy association of Rhode Island" in May '18.

Many faculty and students participated in judging and leading events for the 2018 Science Olympics on April 7, 2018. The Science Olympiad's Connecticut competition takes place yearly in Storrs, CT. Students compete in multiple goal oriented as well as written competitions in teams, with the winning teams moving on to the national competition. **Jon Trump**, **Cynthia Peterson**, **Yasaman Homayouni**, **Gloria Fonseca**, and **Amelia Henkel** lead an astronomy event. **Dave Perry** led the thermodynamics event, and **Ann Marie Carroll** and **Erin Curry** lead an optics event. The winners of the Science Olympics in CT went on to a national competition.

70st CT State Science & Engineering Fair

Dave Perry, **Erin Curry**, and **Ann Marie Carroll** judged and gave out Special Awards prizes at the CT Science & Engineering Fair in Quinnipiac University, on behalf of UConn's Early College Experience program. Three $100 prizes were given to winners in the form of Amazon gift certificates. This past March marked the Science Fair's 71st year running. Middle and high school students from all over the state compete to move onto national finals. The CT Science & Engineering Fair is a charter member of the International Science and Engineering Fair, and is an all-volunteer organization. More than 12,000 students in Connecticut towns compete for the 600 spaces at the state fair.

Sacred Heart Academy

On Friday March 9th, the UConn Physics Department hosted a visit from the AP Physics class of Sacred Heart Academy. Sacred Heart is a young woman's preparatory school in Hamden, CT. Their physics teacher is Nicole Granucci (nee DiNicola), a graduate of our department from the class of 2006.

Undergraduate student Amelia Henkel assists Ann Marie Carroll with a liquid nitrogen demonstration

The group of 30 students started their visit with a demonstration on the curious behavior of many objects at low temperature with a demonstration about liquid nitrogen by David Perry and Anne Marie Carroll. Next up were tours of three working laboratories: the ultra-fast laser lab with Prof. Berrah, the thin film synthesis lab of Prof. Wells, and the Astronomy lab hosted by both Profs. Whitaker and Trump.

Laboratory tours were followed by a pizza lunch with several of our undergraduate students, where the high school students could get the real scoop about life as a physics major at UConn. The final stop was sitting in on the electricity and magnetism section of Phys 1402, an introductory physics course for science majors. Prof. Wu was teaching using the flipped-classroom approach arising from Physics Education Research.

When it was time to leave, the students were energized and excited as they headed for the bus home. Many have been accepted to UConn for the class entering the fall of 2018, and we hope we will see some of these young women again as our own majors.

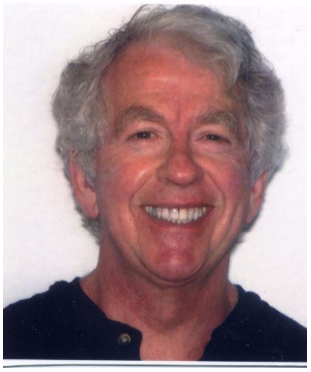
Community Outreach to Middle and High School Students from Hartford schools

The Physics Department scheduled an Open House led by Head Berrah on Saturday April 21. Faculty (**Profs Ronald Mallett, Ilya Sochnikov, Cara Battersby, Diego Valente, Belter Ordaz, Xian Wu, Daniel McCarron, Nora Berrah**; staff **Micki Bellamy** and **Ann Marie Carroll**) gave short lectures and various laboratory demonstrations to spark interests in STEM fields. Undergraduate students **Jacob Hastings**, **Amelia Henkel**, **Tyler Metivier**, **Jacob Franklin**, graduate students **Martin Disla**, **Yasaman Homayouni**, **H. Perry Hatchfield**, and **Mohammad Akhshik**, Post Doc **Nora Kling** also contributed to the event. The school coordinator is the Acting STEM Director for the Hartford Public Schools who worked very closely with Ms. Micki Bellamy. Also participating was David Johnson, with Belcan Engineering Group.

David arranged for SBE (National Society of Black Engineers) and SHEP (Society of Hispanic Engineers Professionals) to provide chaperones. About 50 students came to UConn's Physics Department from the following schools: Classical Magnet, Breakthrough South, Kennelly, and Rawson.

Faculty Recognition

Douglas Hamilton's Retirement



We are losing one of our esteemed colleagues, Douglas S. Hamilton, who joined the physics department in 1979 and retired at the end of the 2018 Spring Term after a distinguished career in teaching, research, and service. Doug is now continuing his affiliation with UConn as an Emeritus Professor of Physics.

Doug received his B.A. in physics from the University of Colorado-Boulder in 1971 and his Ph.D. in physics from the University of Wisconsin-Madison in 1976. He then held a post-doc position in physics and electrical engineering at the University of Southern California (1977-1979) and has been a Professor of Physics at UConn since then. Doug was an Associate Dean at the College of Liberal Arts and Sciences at UConn (2006-2011), Interim Vice-Provost (2009-2010) and Interim Head of the Department of Physics (2011-2013). While at UConn he received numerous honors and distinctions such as the Connecticut Academy of Arts and Sciences, the University of Connecticut Summer Fellow, University of Connecticut Institute for Teaching and Learning Fellow, and served as Chair for the 1993 International Conference on Luminescence.

Doug's research interests centered on the studies of Laser Physics, Quantum Electronics, Optical Properties of Ions in Solids, Non-linear Optics, and Solid State Physics. Doug published work in the best journals in physics and was the major advisor to eight PhD students. Doug's teaching specialties included Physics for the Non-Scientist, Laser and Optical Physics, Physics for the Health Sciences, and Laboratory Physics. His favorite course to teach was PHYS 1010. Doug has commented that "this course has a very high level of diversity among its students, diversity that is measured along every dimension imaginable". It was this diversity that made the course challenging as well as rewarding for him to teach. His mastery of the art and science of teaching lead to him being selected to the freshman class of UConn's "Teaching Fellows".

Doug served UConn in a variety of capacities. As an Associate Dean in the College of Liberal Arts and Science (CLAS), he had oversight of the CLAS undergraduate program and monitored course enrollments with responsibility for adjuncts and TAs to teach extra sections. He guided the CLAS Academic Services Center including student advising, late drop-add, academic probation and dismissal. Doug was the Dean's office representative on the CLAS Curriculum and Courses Committee. He also was a member of the leadership team for the "Teachers for a New Era" Program, managed the 2008-09 enrolment surge and simultaneous budget rescission, guided the "Dual Major" initiative between CLAS and NEAG, represented CLAS on the "Retention and Graduation Task Force", and generated a report to the Board of Trustees on how CLAS prepares students for the "green" economy. Furthermore, he was an adjudicator for academic misconduct cases, chaired six successful searches for CLAS department Heads, represented CLAS on the undergraduate Public Health initiative and Environmental Science major, served on the "Early College Experience" advisory board, was the CLAS representative on the Dubai site-visit team, and was a member of the advisory committee to enhance pre-law, pre-med, and pre-dental advising.

As interim Vice-Provost for Undergraduate Education, he had oversight of UConn's undergraduate programs at the Storrs campus. He developed and implemented a $1.1M "Strategic Investment in Undergraduate

Education" for teaching laboratories and experiential learning. Doug also addressed space issues that arose from expansion of the Honors Program and the Instructional Design Group.

Doug also served as interim Head of the Department of Physics. He emphasized the creation of a welcoming and inclusive climate within the department for all faculty, staff, and students. He initiated a semiannual "town hall meeting" with faculty, staff, and student participation, encouraged the creation of an active "Women in Physics" group, completed the hiring of two new physics faculty, increased number of undergraduate majors, compiled departmental data on PhD degree progress, and instituted an annual graduate student progress report.

His service also included membership in the UConn Senate, the Scholastic Standards Committee, the UConn Senate Executive Committee, and the online Course Standards Subcommittee of UConn Senate. He was the Senate Representative to the UConn Board of Trustees and its Financial Affairs Committee and served on the Provost's Program Review Committee. Doug also served as chair of the "Select Committee" to hear final appeal of PTR cases, and was active on a variety of Physics Department Committees including PTR, advisory, undergraduate affairs, space, diversity and multiculturalism, faculty and staff searches, and course teaching assignments.

Although Doug says he is retiring, we will not be surprised to see him in his lab working on his Raman spectrometer which he generously plans to leave behind to the Condensed Matter research group. We look forward to his continued presence around the Department in the future!

Alan Chasse's Retirement

A Connecticut native, Alan Chasse grew up in Wolcott, where he was one of many (nine!) children. The mischievous Alan was nicknamed "The Instigator," but upon turning 18 he rose to responsibility at General Motors, where he trained to be a machinist and made bearings for the aircraft industry.

In 1989, Alan joined UConn's Grinding Center, where he set up a new $3M facility. In 1997, an opportunity arose for him to join the Physics Department's machine shop, to which he brought much needed updates. For example, hand drawn figures ceased to be the norm and were replaced with modern and precise PC generated drawings. No longer could a smudge enlarge a project to titanic dimensions! Moreover, the electronic filing system ensured that projects would be archived for future students' benefit.

In his 20 years as a machinist in the Physics Department, Alan completed hundreds of jobs each year, which has enabled countless young scientists to earn their degrees and P.I.'s to pursue their research programs.

Alan retired in October 2017, but he's not staying idle. His lifelong passion of adventure cycling keeps him busy as he regularly racks up 300 miles a week (when there's no snow!). Alan and Lillian also occupy themselves with antique furniture refurnishing.

A Cause for Applause!

The Physics Department would like to give a heartfelt 'Thank You!' and 'Congratulations!' to Alan and Doug.

Enjoy your much deserved retirement!

Physics Department Achievements

Faculty achievements have led to an increase in the Department's ranking which is #46 among public institutions and is ranked #71 out of 1,389 public and private universities. Our peer public physics departments were U. of Illinois-Chicago ranked #48, University of Nebraska, Lincoln ranked #49. The institution we aspire to be in three years, *if we are able to make the desired hires*, is U. of Massachusetts-Amherst ranked #35. Faculty published 134 research work in journals such as Physical Review Letters, Nature Journals, books, and book chapters.

The Physics Department has this year 19 Fellows from the American Physical Society, we graduated 12 PhDs and 7 Masters, our undergraduate students are accepted to top graduate schools, our funding increased 18% since last year and most faculty are federally funded. The total grant this year is $4,596,187 ('17-'18)

Highlights of Physics Faculty Achievements

- **Alexander Kovner** is a Fellow of the American Physical Society, is a visitor of prestigious CERN, Switzerland laboratory, and he received a Fulbright fellowship.
- **Suzanne Yelin** is a Fellow of the American Physical Society.
- **Jason Hancock** was tenured and promoted to Associate Professor, spring 2018.
- **Andrew Puckett** was selected to be a co-spokesperson of a large experimental program at Jefferson-National Laboratory, VA.
- **Tom Blum** was selected "Fermilab Distinguished Scholar".
- **Gerald Dunne** led the coordination of a research program at prestigious KAVLI Institute of Theoretical

Physics, UC Santa Barbara, CA during fall 2017.

- **Nora Berrah** was selected as the leader and Report Writer of a Round Table Discussion for the "*Future of X-Ray Laser"* for the Department of Energy, Basic Energy Sciences (~$2B budget).

Innovative Teaching Programs

- The Department of Physics is transforming the traditional way of teaching introductory physics courses to a modern 'Studio Physics or "Scale-Up" style that consists of integrating the lab work with the lecture material to enable students to learn physics more effectively and to improve their grades. The Department started thinking about developing and implementing this effort in 2016. Team members working on this effort so far are **Diego Valente**, **Sarah Trallero**, **Xian Wu, Belter Ordaz**, **Deepak Sainju**, **Ann Marie Carroll**, **Jason Hancock**, **Barry Wells**, **Tom Blum**, **George Gibson** and **Nora Berrah**. Other faculty are also interested to join this effort.
- **Xian Wu** has been named Scientific Teaching Fellow for AY 17-18 by Yale Center for Teaching and Learning and received Provost's Academic Plan Mini Grant Competition for innovation in teaching.
- **Diego Valente** received the Provost's Academic Plan Mini Grant Competition for teaching innovation.

New Arrivals to the Physics Department

New Senior Machine Shop Engineer in Physics

Ray Celmer

Ray Celmer joined the Physics Department this summer as our new Senior Machine Shop Engineer, replacing Alan Chasse who retired. Ray came to us from Karl Storz Endovision of Charlton, MA where he managed the design of new flexible endoscopes. Building endoscopes requires the fabrication of complex parts to tight specifications. Previous to working at Karl Storz, Ray had held various positions as a machinist, shop supervisor, and designer at various small manufacturing companies in Eastern Connecticut and Western Massachusetts, and thus is a good background for designing and building experimental apparatus for physics. Ray joins us at a busy time since not only do we have several new professors building equipment for their laboratories, but our planned move to the newly renovated building brings plenty of challenges – including figuring out how to maintain our capabilities in a smaller space.

In addition to experimental apparatus, Ray also has a reputation of playing a mean set of drums. We hope he'll be brave enough to showcase his drumming talents at one of the departmental events in the near future.

New Faculty in Physics

Assistant Professor Phoebe DeVries will join our faculty starting Spring 2019. Phoebe earned her PhD in Harvard's Department of Earth and Planetary Sciences. Prior to graduate work, she received her B.A. from Harvard in Applied Mathematics as an MPhil in polar studies from Cambridge University. Her research focuses on modeling the deformation and straining of the Earth's surface from earthquake fault motions, emphasizing the spatial and temporal changes in the strain accumulation between successive earthquakes along known faults. Most recently she has been working with machine learning methods in earthquake science, including training neural networks to explain aftershock locations and efficiently emulate computationally expensive calculations in layered materials with complex relations between stress and strain.

Welcome Phoebe and Ray!

New Post-Doctoral Fellows in Physics

Also hired within the last year are the new Post-Doctoral Fellows: **Dr. Stefan Diehl** working with Prof. Kyungseon Joo at Jefferson Laboratory in Newport News, Virginia and **Dr. Turgut Yilmaz** working with Prof. Boris Sinkovic in UConn Storrs.

Welcome Prof. Barry Wells, our new Department Head!

We are very pleased to announce that Barry Wells has been selected as the new Physics Department Head and started his five year appointment on August 23, 2018. Barry succeeds Nora Berrah, who did not wish to serve a second term. Barry and Nora are working collaboratively to insure a smooth leadership transition.

Barry obtained his B. S. in Physics from Stanford University in 1986. He first tried graduate school at the department of Material Science and Engineering at Cornell University (1986-1987), but that didn't take and he headed to Silicon Valley to work at Southwall Technologies for a short time. He took a second try at graduate school back at Stanford University in the Department of Applied Physics where he received his M.S. (1990) and Ph.D. (1992). He was a postdoctoral fellow in the Physics Department at MIT (1992-1996) before another stint in high tech research and development with Phantom Works of McDonnell Douglas in Mesa, AZ which was then bought by Boeing. Barry came back to academic science when he joined the University of Connecticut's Department of Physics in 1998. He has been a full professor at UConn since 2009. Barry has a distinguished career garnering several distinctions and awards. He was elected to the Connecticut Academy of Science and Engineering (CASE), he received a Cottrell Scholar Research Corporation of America award, a National Science Foundation CAREER Award, a Sloan Foundation Research Fellow award, a Sage Fellowship from Cornell University and he was inducted at the Phi Beta Kappa society at Stanford University. Barry was a guest Professor at the University of Montpellier, France and a visiting Scientist at the Paul Scherrer Institute in Switzerland.

Barry is ready to serve as our new Department Head as he has served the Physics Department and UConn for many years and in many ways. Barry has worked on many Department committees, chaired, and served in several faculty searches. He was Associate Department Head for Undergraduate Affairs from 2007-15 and developed plans to deal with reduced resources following economic troubles of 2008-09. He has helped to revitalize the Physics Club and worked hard with Micki Bellamy and Tom Blum to enhance undergraduate student recruiting, leading to a 75% increase in our undergraduate major enrollment. Currently, Barry serves as the Advisor to the Society of Physics Students, UConn Chapter.

The Physics Department embarked on a new teaching pedagogy in 2015. Barry has played an important role in this effort along with other members of the Department (Diego Valente, Tom Blum, Nora Berrah). This project now includes other members of the scale-up team (Jason Hancock, Xian Wu, Sarah Trallero, Deepak Sainju,

Belter Ordaz, and George Gibson). In a nutshell, the team developed plans to change the department's pedagogy for teaching introductory physics using the studio approach developed in the Physics Education Research community. This approach merges lectures and laboratory sessions and requires full active engagement of students. Our team coordinated with architects to develop appropriate classrooms during the physics building renovations.

Barry's research interests are in the investigation of materials for which quantitative theory describing the behavior of conductors, insulators, and semiconductors fails spectacularly; not even categorizing materials as insulators or conductors correctly. Such materials are known as Mott Insulators. Barry's lab produces unique samples with extreme oxygen content, characterizing them using equipment in the Physics Department and IMS at UConn; as well as conducting advanced experiments at national and international facilities. The impact of their research has been in superconductivity in thin films of $FeTeO_x$, $La_{2-x}Sr_xCuO_{4+y}$ crystals. Barry has been funded by NSF, the Sloan Foundation, and DoE, enabling him to train many Masters and PhD students, and publish over 100 papers in high profile journals.

Barry contributes to the scientific community by serving as Divisional Associate Editor for Condensed Matter Physics, *Physical Review Letters*; the NSERC (Canada) review committee for Physics; the Visiting Review Committee for Basic Science Programs at Los Alamos National Laboratory; the Canadian Light Source Peer Review Committee; the Proposal Study Panel of the Advanced Light Source, Lawrence Berkeley National Laboratory; the DOE Early Career Proposal Panel; the NSF Review Panel for Superconductivity and for Materials Research Fellowships. In addition, Barry has organized national and international conferences and workshops, and is a referee for many scientific journals.

Change of Guard in the Physics Department

This fall is the start of a new Headship in the Physics Department. Nora Berrah was an external Department Head hire who served for one term from 2014-2018. During her tenure she aimed to provide transparent leadership and a consistent vision for the Department to grow and improve in research, teaching and administration. She obtained eight faculty positions, six Assistant Professors in Residence (APiR) positions, and one additional teaching lab technical position in the Storrs campus. She also contributed to the hiring of two APiRs in Waterbury and Stamford regional campuses.

Administration: During her first year, with the support of CLAS, Nora improved the administrative organization in the Department in order to streamline the efficiency and services that the staff provide to the faculty. She reorganized the front office, promoted Alessandra Introvigne as the supervisor of the office staff, and recommended the hiring of excellent new office personnel; Micki Bellamy, Carrie Cichocki, and Anna Huang.

Research: In an effort to build up the Department's research, Nora established the "Future of Department Committee" composed of members of the different research areas in order to brainstorm and strategically hire faculty to strengthen the current Physics Department research fields. One important development has been the new Astrophysics research program. With the support of the previous Dean, Jeremy Teitelbaum, the excellent search committees, and the support and collegiality of the whole Department, we hired eight faculty

positions in Condensed Matter Physics (one experimentalist, Assistant Prof. Ilya Sochnikov; and one senior Theorist, Prof. Alexander Balatsky), in Astrophysics (three Assistant Profs. Cara Battersby, Jon Trump, and Kate Whitaker), in Particle Physics (one theorist Assistant Prof. Luchang Jin), and in Atomic, Molecular and Optical Physics (two experimentalists, Assistant Prof. Daniel McCarron and tenured Associate Prof. Carlos Trallero). Nora mentored assistant professors and stimulated further pursuit of external funding by providing seed funding to mid-career faculty.

Nora's tenure was eventful in preparing with the faculty various documents such as drafting PTR criteria, guidelines for assistant and associate professors, and preparing from scratch the Department Bylaws. Furthermore, the Department prepared its self-study report and hosted an onsite review which led to excellent reviews!

Education: On the education front, Nora obtained six Assistant Professors in Residence (APiRs) positions at the UConn Storrs campus to help us cope with the large enrollment generated by the Next Generation UConn. Four APiRs were hired, Diego Valente, Xian Wu, Deepak Sainju, and Belter Ordaz; as well as two that will be hired this fall and will start in fall 2019. Two additional APiRs, Howard Winston and Keith Wood, were hired at the Waterbury and Stamford campuses, respectively.

Nora became interested in new teaching pedagogies from her physics education experience at Western Michigan University. She invited Ed Bertschinger, a former MIT Physics Department Head, to give a key colloquium, "Creating a Thriving Physics Department for Students" where he informed the Department about studio physics. This essential presentation in February 2015, attended by then Dean Teitelbaum, followed by other education talks, stimulated the department to decide to use studio physics to teach introductory physics.

This approach integrates lectures and laboratory sessions stimulating the active engagement of students. A proposal to CLAS, prepared by Diego Valente, Barry Wells and Nora Berrah, was accepted permitting the Department to coordinate with architects to build, as part of the GANT renovation, new classrooms designed to facilitate studio-physics style classes. The studio physics project, endorsed by the whole Department, currently includes several faculty and staff, (Diego Valente, Sarah Trallero, Xian Wu, Deepak Sanju, Belter Ordaz, Ann-Marie Carroll, Jason Hancock, Barry Wells, Tom Blum, George Gibson, and Nora Berrah).

Climate: Nora strove to build a friendly, positive climate and a sense of community for all in the Department. She supported Department outreach activities by faculty and staff and she was personally active in promoting diversity and inclusion through her own work with middle and high schools in CT, as well as at the Universities and National Laboratories, both domestic and international.

Nora looks forward to supporting Barry Wells as he takes the reins of the Department, and to continue serving the Department alongside the rest of the faculty. She plans to continue working on the studio-physics teaching initiative. She also plans to foster and participate in research collaborations within the Department as well as with faculty at the Tech Park, in other departments and colleges. She has many papers she wants to write with her research group, and she wishes to carry out experiments at her UConn Ultrafast Laser Lab and at Free Electron Lasers around the world, thus she will not rest any time soon!

Endowment News

The Physics Department is very grateful for contributions to its many endowed and non-endowed funds, contributions that enable us to significantly enhance our educational and research missions in a variety of ways, as well as those of the University of Connecticut as a whole. A primary use of the funds is to support deserving graduate students, but other uses include distinguished lectures, undergraduate and graduate student awards, an undergraduate research fund, research-related funds, and a general Physics Department fund. A list of these funds is provided below where information on the various funds in the University of Connecticut Foundation can be found, funds that support the Physics Department in numerous important ways. The entire department is grateful to those who contribute to these funds and thereby provide important assistance that significantly enhances our department's educational and research missions.

Over the years endowment funds have been set up by former students, by friends of the department, and by members of the Physics Department faculty. Last year we reported on the setting up by our late departmental colleague Professor Edward Eyler of an advanced teaching laboratory for physics majors. The laboratory bears the plaque: "Edward E. Eyler Advanced Physics Teaching Laboratory", and will serve to memorialize Ed's commitment to teaching in perpetuity. Since its establishment the Advanced Physics Teaching Laboratory has played a significant role in the development of our undergraduate physics major experimental physics program. This year we received an endowment from another member of our faculty, Professor Philip Mannheim, who along with his wife Fay set up the Fay and Philip Mannheim Graduate Fellowship in Physics Endowment.

We will be hosting our twenty second annual Katzenstein Distinguished Lecture Friday October 26, 2018 to be presented by Nobel Laureate Professor Rainer Weiss, who in 2017 shared the Nobel Prize in Physics with Professor Kip Thorne and Professor Barry Barish. This lecture is supported by an endowment established by Drs. Henry and Constance Katzenstein, Henry having been the very first student to be awarded a Ph.D. in Physics at the University of Connecticut.

As well as fund the Katzenstein Distinguished Lecture Series, the Katzenstein Endowment also provides an annual $250 prize and a plaque of recognition for the best research paper by an undergraduate Physics major, and is presented at the annual Sigma-Pi-Sigma colloquium. This year the Katzenstein Prize was awarded to Connor Occhialini for his paper "Negative thermal expansion near two structural quantum phase transitions", which was published in the first volume of a new journal Physical Review Materials and was distinguished as an "editor's suggestion". This was Connor's third publication in the Physical Review during his undergraduate career at UConn. In addition, Connor has delivered two talks at the American Physical Society's March Meeting and received many awards and fellowships from the University for outstanding scholarship. Connor graduated this Spring and will begin the Physics PhD program at MIT in Fall 2018, where his objective is to continue his research in experimental condensed matter physics.

Connor Occhialini at the beamline where he performed his negative thermal expansion experiment

There were two other submissions for the undergraduate Katzenstein prize: Charles Maher submitted a paper "Advanced Enzyme Biohydrogels", and Sadhana Suresh submitted a paper "Nuclear Beta Spectroscopy for the Helium-6 Experiment".

Another endowment-supported lecture series is the Edward Pollack Endowment for Physics, initiated by Physics Department Professor Ed Pollack's family and many friends. It supports the annual Pollack Distinguished Lecture in Atomic, Molecular, and Optical Physics. This year on October 20, 2017 the distinguished lecturer was Professor Matthias Weidemueller, Physics Institute and Heidelberg Center for Quantum Dynamics, University of Heidelberg. The title of his talk was "Taming Atomic Giants – How Rydberg Atoms Became Veritable Quantum Simulators".

In the following are details regarding the various funds in the University of Connecticut Foundation, funds that support the Physics Department in numerous important ways. The entire department is grateful to those supporters and friends who contribute to these funds and thereby provide important assistance that significantly enhances our department's educational and research missions.

Non-Endowed Funds

20351 Physics Department

20366 Physics Thermoluminescence Lab

22398 Space-time Twisting by Light Project

22457 Time Domain Fund

22520 Edward N. Frisius Memorial Fellowship

22662 Anne and Win Smith Fellowship Fund

23428 Quantum Fund

Edouard Paradis Scholarship (pending)

Endowed Funds

30438 Katzenstein Endowment in Physics

30641 Charles E. Swenberg Memorial Scholarship Fund

30723 Nagavarapu Graduate Award in Physics

30743 Issac S. and Lois W. Blonder Graduate Fellowship in Physics

30876 Marshall and Georgianna Walker Graduate Award Fund

30911 Kurt Haller Endowment for Physics Research and Graduate Education

30951 Ruth and Paul Klemens Endowment

30958 Edward Pollack Endowment for Physics

31028 Dwight Hills Damon Graduate Fellowship in Experimental Physics

31224 Kurt Haller Academic Opportunity Fellowship Fund

31409 Mark E. Miller Undergraduate Research Fund

31530 Edward E. Eyler Endowment for Physics Advanced Labs

31717 Fay and Philip Mannheim Graduate Fellowship in Physics Endowment

Making a Gift:

There are many ways of making a gift to the UConn Foundation in support of the Physics Department, including checks, marketable securities, planned or estate gifts and through payroll deduction for UConn employees. Checks should be made payable to the University of Connecticut Foundation, with a cover note directing your gift. All gifts are eligible as tax deductions as The University of Connecticut Foundation, Inc. is recognized as a 501(c)(3) non-profit organization. Donors have the option of remaining anonymous if they wish. If you are interested in the possibility of establishing a new fund, please contact our Department Head Prof. Barry Wells, and/or our Administrative Manager, Alessandra Introvigne.

UConn Foundation Department of Physics Funds Donation Page

I/We would like to support the Physics Department Programs. Please direct my gift of $ _____ to the fund (s) listed below. Please include the amount of the donation (if designating to various funds), name and number of fund (s):

_____

_____

Matching Gift

I work for a matching gift company. The form is enclosed.

My company is: _____

_____

_____

Should you choose to support one of these funds, you can send your contribution directly to the University of Connecticut Foundation. Please include the fund name and number on your check:

University of Connecticut Foundation
2390 Alumni Drive, Unit 3206
Storrs, CT 06269-3206

We greatly appreciate your support!

SAVE THE DATE: Friday, October 26, 2018

Invitations for the Katzenstein lecture and dinner have been sent. If you are interested in attending but did not receive your invitation, please contact:

Caroline Cichocki
Phone: 860-486-4924
Email: caroline.cichocki@uconn.edu