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Director's Matters

Guest column by Greg Good, Director, Center for History of Physics



Rutherford's Nuclear World

"In 1911, 40-year-old Ernest Rutherford discovered the nucleus of the atom. That is the usual, simple, factual statement most science students know quite well. The story of this discovery, however, involves more than one person, research over several decades, and a very human story."

So begins the new web exhibit [Rutherford's Nuclear World](#) on the website of the Center for History of Physics of the American Institute of Physics. Since the 1990s, AIP's History Programs have been path breakers in the use of the Internet to "preserve and make known" the history of physics. The new Rutherford exhibit joins a dozen others, on topics ranging from Albert Einstein and Marie Curie to the transistor and the laser.



John A. Ratcliffe and Ernest Rutherford stand beneath a famous sign, made by Vivian Bowden because a nearby signal amplifier used a microphone. The amplifier made possible very sensitive studies of charged particle events, such as the emission of alpha particles. C.E. Wynn-Williams took this photograph in 1932. Courtesy Emilio Segrè Visual Archives.

The original goal of the new exhibit was to get beneath the surface of the 1911 discovery of the nucleus. I started out to tell how the discovery occurred, to challenge both newcomers to the history of physics and old hands to reevaluate simple discovery. I was surprised to find one of Rutherford's students from that time, Edward Andrade, say that there was no excitement about the discovery of the nucleus in 1911. Andrade wrote "... the nuclear theory of the atom attracted hardly any attention. Its immense significance was not realized." Even Rutherford reflected back in 1932, in a letter to his old colleague Hans Geiger of Manchester days, "Those were happy times in Manchester, and we wrought better than we knew."

As often happens in historical research, I too discovered that the story of 1911 could not be told in isolation from the rest of Rutherford's career. Ernest Rutherford was one of those historical figures, large and powerful and dominating, whose whole life infused his work. From his early days exploring radioactivity in Montreal, through the



Research Group, Montreal, 1905–6. Top row: G. Dunn, R. Lawrence, B. Gordon, L. Levi, R.W. Boyle. Middle row: R.K. McClung, Otto Hahn, A.S. Eve. Bottom Row: M. Levin, H.T. Barnes, John Cox, and Ernest Rutherford. Credit: Chadwick, 1962, 1: opposite p. 832

work with scattering alpha particles in Manchester and the disruption of the nucleus at the Cavendish Laboratory in Cambridge, England, Rutherford explored the atomic world with an unparalleled experimental passion. To tell the story of 1911, I felt compelled to tell the broader story of Rutherford's nuclear world.

The production of Rutherford's Nuclear World rested on the historical research of three undergraduate interns of the summer intern program of the Society of Physics Students: Mary Mills, Fidele Bingwa, and Ryan M. Barley. The interns read Rutherford's original publications, his letters, and the oral history interviews that AIP conducted with Rutherford's students in the 1960s and 1970s. They had to learn the physics, but they also learned how to evaluate and use historical evidence. Their joy of discovery helped take the web exhibit in directions I had not anticipated. The other essential person in producing the exhibit was Ada Uzoma, our web designer. Her crisp, simple design pulls the reader deeper into the story.

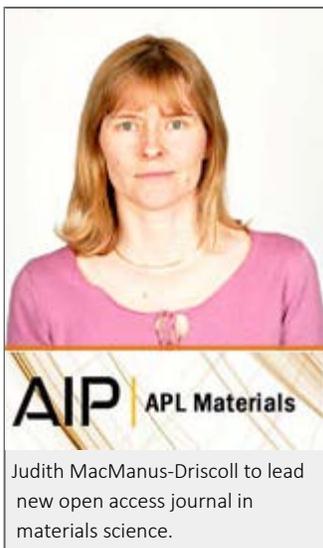
This exhibit is built firmly on resources in AIP's Niels Bohr Library and Archives. The exceptional [book collection](#) includes every edition of Rutherford's marvelous *Radio-activity*, which he updated as phenomena became known. It also includes important and now neglected works by historians such as Thaddeus Trenn on Rutherford and Soddy, or John Heilbron on H.G.J. Moseley. The most important resources, however, are the archival ones, such as the oral history interviews and photographs. AIP now has over [850 oral history transcripts](#) on our website, where they are available to the world. Among Rutherford's students and colleagues represented in this collection are Edward Andrade, James Chadwick, John Cockcroft, and Niels Bohr. AIP's [Emilio Segrè Visual Archives](#) provided most of the photographs. All the staff of AIP's History Programs contributed to this exhibit.

In one way, AIP's newest web exhibit differs from earlier ones. Rutherford's Nuclear World will continue to grow, as I and future SPS interns explore new parts of the story. We will explore, for example, "radiations" from Rutherford's achievements, such as the development of particle accelerators and the use of radiation in medicine. We will also add animations as they are developed. We will explore historical themes, such as the participation of women in nuclear physics. We will explore ways to interact with our readers, who come from every corner of the globe. Rutherford's Nuclear World provides us the opportunity to share the wealth of AIP's History Programs with students and "the curious" everywhere.

Publishing Matters

AIP appoints editor of *APL Materials*

AIP Publishing is pleased to announce the appointment of Judith



MacManus-Driscoll as editor of its new open-access, rapid-publication journal, *APL Materials*. Affiliated with AIP's highly regarded *Applied Physics Letters* (APL), *APL Materials* will build on the history and rich tradition of APL, now celebrating its 50th anniversary. "I am extremely pleased and proud to take on the position of editor for this new open-access publication," says MacManus-Driscoll, a professor of materials science in the Department of Materials Science and Metallurgy of the University of Cambridge (UK). "The journal will communicate the most valuable and timely research in the field, enabling us, for example, to further our quest for ever-higher-performance functional products and to address needs that range from healthcare to our urgent demand for clean energy." *APL Materials* will begin accepting submissions January 1, 2013; publication of the first issue is expected in the spring. See the [press release](#) for more information

Physics Resources Matters

Steve Feller receives the Worth Seagondollar Award

Dr. Steve Feller, Coe College (IA), was presented with the prestigious Sigma Pi Sigma Worth Seagondollar Award at the 2012 Quadrennial Physics Congress, held last month in Orlando, FL. Feller is recognized for being an exemplary researcher in the area of glass physics, an extraordinary mentor of young scientists at Coe College, and an inspirational leader for its Society of Physics Students (SPS) chapter. A champion of undergraduate research, Feller has created numerous opportunities for his students to actively participate in scientific discovery. Feller served two terms as Sigma Pi Sigma president, and led the planning for both the 2008 and 2012 Sigma Pi Sigma Congresses. In every way, he has served the physics community, Sigma Pi Sigma, and SPS with distinction.



Karen Williams presents Steve Feller with the Worth Seagondollar Award

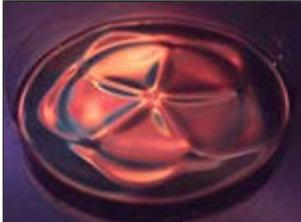
The Worth Seagondollar Award recognizes extraordinary levels of service and commitment to Sigma Pi Sigma and SPS. Awardees are determined by a unanimous vote of the Executive Committee of the SPS National Council. The award was first presented to its namesake, Worth Seagondollar, North Carolina State University, at the 1996 Congress of Sigma Pi Sigma, held in Atlanta, GA. The quadrennial congresses have served as appropriate venues to make subsequent award presentations, including George Miner, University of Dayton (OH), in 2000; Peggy Dixon (posthumously), Montgomery College (MD), in 2004; Karen Williams, East Central University (OK), in 2008; and most recently, Steve Feller, Coe College (IA), in 2012.

Worth Seagondollar was a member of the Manhattan Project, the first to measure the critical mass of plutonium, and was present at the Trinity Test. He was a very successful SPS chapter advisor at both the University of Kansas and North Carolina State University, and was a leading nuclear physicist.

Seagondollar played a central role, as Sigma Pi Sigma president, in the merger of the AIP student sections and Sigma Pi Sigma that created the Society of Physics Students (SPS). Selected also as a fellow of the American Physical Society, he was an active member of numerous professional organizations and is now a professor emeritus at NC State University.

Member Society Spotlight

APS/DFD Meeting captures media attention with exciting news and stunning images



Observation of a Star-Shaped Surface Gravity Wave, from the DFD Gallery of Fluid Motion. Image credit: Jean Rajchenbach, Alphonse Leroux, and Didier Clamond (CNRS and Université de Nice, France).

Compelling news flowed at the 65th annual meeting of the American Physical Society's (APS) Division of Fluid Dynamics (DFD), which was held November 18–20, 2012, in scenic San Diego, CA. AIP's Media Services team, after combing through nearly 2,000 meeting abstracts, publicized nearly a dozen presentations. Among the most covered by the media were: [how mosquitoes—much like modern aircraft—fail at flight in heavy fog](#), [the mathematics behind the curious penguin huddle](#), and [how an owl's uncanny ability to fly in acoustic stealth could lead to quieter aircraft](#). Several of these topics were highlighted in a webcast press briefing, which is currently archived at www.aipwebcasting.com.



Publicity for the meeting also highlighted a number of evocative images and videos in the online image gallery, which is part of the [DFD Virtual Press Room](#).

Around AIP

Holiday drives



The Melville Publishing Center is taking part in the annual [Toys for Tots](#) campaign, operated by the US Marines of Alpha Company, 6th Communications Battalion. To make wishes come true for impoverished children in Suffolk County, NY, employees are invited to donate new, unwrapped gifts through December 10. The Toys for Tots collection box is located in the lunchroom.

In College Park, the ACP Events Committee is working with the [College Park Youth and Family Services](#) (CPYFS) to organize donations of gifts and basic necessities to local families. Staff may select a gift request from one of the pantries and place wrapped gifts in the collection box. Donations will be accepted through December 19.

Off the Press



Cover: Unlike vertebrates, which use respiratory and circulatory systems to transport oxygen to tissues, insects do so almost exclusively with an elaborate tracheal system. Air-filled tracheal tubes are visible in this synchrotron x-ray phase-contrast image of one of four darkling beetle species (left, third from top). The exquisite detail allowed researchers to determine how the tubes' volume scales with body mass. (Image courtesy of Alexander Kaiser and C. Jaco Klok, adapted from A. Kaiser et al., *Proc. Natl. Acad. Sci. USA* 104, 13198, 2007.)

Coming Up

December 3–7

- AGU 2012 Fall Meeting (San Francisco, CA)

Through December 10

- Toys for Tots drive (Melville)

Wednesday, December 12

- Staff birthday breakfasts (Melville and College Park)

Thursday, December 13

- Milestone awards presentation and quarterly all-staff update (Melville)
- Holiday party (Melville)

Wednesday, December 19

- Holiday party (College Park)

Through December 19

- ACP holiday gift drive (College Park)