



“Jimfest 2018”, aka the Wisconsin Atomic Spectroscopy Seminar, was a workshop held at the University of Wisconsin-Madison on April 20-21, 2018. The workshop was in honor of UW Professor of Physics James E. Lawler. The invited speakers were selected from the many students and collaborators of Prof. Lawler. The talks concerned a variety of topics such as laboratory astrophysics, ultracold plasmas, plasma processing, gas discharge lighting, and the interpretation of stellar spectra. The workshop banquet included a presentation that summarized a few highlights of Prof. Lawler’s career.

The purpose of this collection is to provide a permanent archive of the presentations given at the workshop. We are grateful to the University of Wisconsin-Madison Library for providing the MINDS@UW service.

Scott Bergeson, Brigham Young University

Thad G. Walker, University of Wisconsin-Madison

## Biography of J. E. Lawler

J. E. Lawler was born in St. Louis, Missouri, June 29, 1951. In 1973 he received a Bachelor of Science degree, Summa Cum Laude, from the University of Missouri at Rolla. As an undergraduate he performed research under the direction of Professor John T. Park on the U.M.R. Heavy Ion Energy Loss Spectrometer.

In 1974 he received a M. S. degree, and in 1978 he received a Doctor of Philosophy degree from the University of Wisconsin at Madison. His thesis title was "Dye Laser Studies of Pulsed High Pressure Gas Discharges", and his thesis advisor was Professor L. W. Anderson.

After leaving Wisconsin he worked as a Research Associate at Stanford University in the group of Professors Arthur L. Schawlow and Theo W. Hansch from 1978 to 1980. J. E. Lawler and his collaborators at Stanford developed new techniques for performing high resolution laser spectroscopy in gas discharge plasmas. These techniques for Doppler-free spectroscopy exploited sensitive optogalvanic detection.

J. E. Lawler returned to the University of Wisconsin as a faculty member in 1980. His current research interests are in two areas, both of which involve gas discharge plasmas and laser spectroscopy. He is developing and applying laser spectroscopic techniques for determining accurate absolute atomic transition probabilities. He is also using laser and other spectroscopic diagnostics to study discharge plasmas for applications including electric power switches. He has written more than 230 peer reviewed articles and holds two patents. He served as Physics Department Chair from 1994 to 1997.

J. E. Lawler has received numerous fellowships including a National Science Foundation Graduate Fellowship and a Wisconsin Alumni Research Foundation Graduate Fellowship while a student at Wisconsin, and a H. I. Romnes Faculty Fellowship from the University of Wisconsin. He is a fellow of the American Physical Society, a fellow of the Optical Society of America, and a fellow of the U.K. Institute of Physics. He won the H. Q. Fuller Award from the University of Missouri. He won the 1992 W. P. Allis Prize of the American Physical Society. He won the 1995 Penning Award from the International Conference on Phenomena in Ionized Gases. {These are the two highest National and International Awards in the field of Low Temperature Plasma Physics.} He won the 2017 AAS Laboratory Astrophysics Prize *"For his contributions in atomic physics to advance our understanding of galactic nucleosynthesis and chemical evolution. His spectroscopic work has opened a new era of stellar chemistry by advancing our ability to compare nucleosynthesis predictions with accurate relative elemental abundances."*

He is currently the Arthur and Aurelia Schawlow Professor of Physics.

# Jimfest Scientific Program

## Friday, April 20, 2018

1:00 Scott Bergeson, Brigham Young University, *"High energy density plasma simulations using ultracold neutral plasmas"*

1:30 Elizabeth DenHartog, University of Wisconsin-Madison, *"UW Laboratory Astrophysics"*

2:00 Maria-Teresa Herd, Mt. Holyoke College, *"High precision spectroscopy on cesium-133"*

2:45 Chris Sneden, University of Texas, *"A Fresh Look at Abundances of Iron-group Elements in Very Metal-Poor Stars"*

3:30 Ian Roederer, University of Michigan (Physics Department Colloquium Speaker), *"The astrophysical r-process: what we are learning from gravitational waves, dwarf galaxies, and stellar archaeology"*

5:00 Gillian Nave, National Institute of Standards and Technology, *"Measurements of branching fractions using Fourier transform and grating spectroscopy"*

5:30 Eric Benck, National Institute of Standards and Technology, *"Downstream hydrogen plasma cleaning for mass metrology at NIST"*

6:30 Dinner Speaker: Thad Walker, University of Wisconsin-Madison, *"Jim Lawler's Science: Above and Below the H-Line"*

## Saturday, April 21, 2018

9:30 Michael Wood, University of St. Thomas, *"Six Lines to Tell a Story"*

10:00 Uwe Kortshagen, University of Minnesota, *"From nonlocal electrons to delocalized electrons and artificial atoms"*

10:30 Ken Menningen, UW Stevens Point, *"How I Became a Non-Chemist"*

11:30 Tim Sommerer, GE Global Research, *"Studying interesting phenomena: GE and Jim Lawler"*

12:00 Graeme Lister, Lighting Consultant, *"Gas Discharge Lamps- A Requiem"*

## Posters

David Huber, University of Wisconsin-Madison, *" $2^+$  Ion Concentration and the Double Photoionization of Aromatic Organic Molecules"*

David Nitz *et. al.*, St. Olaf College and NIST, *"Transition Probabilities for Neutral Cerium from Boltzmann Analysis of Fourier Transform Spectra"*