Edward A. Laag

VITAL INFORMATION

Address:
870 Brooktree LN Apt 146
Vista, CA 92081

(951) 581-7471
edward.laag@email.ucr.edu
Citizenship: USA

CAREER OBJECTIVES

- Hands-on work developing adaptive optics (AO) instrumentation for industrial and medical device applications (microscopy, vision science, lasers etc...)
- Design control systems in software for advanced AO
- Contribute high angular resolution (HAR) imaging data to fields such as biology, medicine, defense, remote sensing, and astronomy.

EDUCATION

University of California, Riverside, California USA

Ph.D. 09/2003 - 08/2009 (expected graduation date)

- Advisor: Dr. Gabriela Canalizo (UCR)
- Topic: "The Multi-wavelength Extreme Starburst Sample (MESS) of Luminous Infrared Galaxies" - observational astronomy component
- Topic: "Multi-Conjugate Adaptive Optics Results from the Lab for Adaptive Optics" - instrumentation component

B.S. Physics and B.S. Applied Math, 09/1999 - 08/2003

- Topic: "Radio Astronomy of the Sun and Moon" (Senior Honors Thesis)

EXPERIENCE

- *Graduate Student Researcher*, UCR Aug. 2007 – Apr. 2009
  Research for dissertation: Reduced and analyzed AO imaging data from Lick Observatory NGS-AO system. Obtained telescope time on Spitzer Space Telescope and NASA Infrared Telescope Facility (IRTF). Reduced 2.2 micron imaging data from IRTF and far-IR imaging data from Spitzer. Obtained and reduced optical spectroscopy data.
- *Graduate Student Researcher*, UCSC -LAO Jan. 2006 – Jul. 2007
  Lab work on the MCAO/MOAO testbed: Adapted tomography algorithms for control of the system. Aligned optics for experiments. Developed control systems for multi-conjugate AO system. Tested operation and analyzed performance of MCAO system. Tested new open-loop control algorithm for ALPAO/MIRAO 52 actuator membrane mirror. Published results in peer-reviewed engineering journal.
- *Teaching Assistant*, UCR Sep. 2004 – Dec. 2005
  Discussion leader for Physics 006: *The Violent Universe*
  Discussion leader for Geology 004: *Natural Hazards and Disasters*
  Assisted with grading of exams. Reviewed classroom material during discussions and held office hours for students.

TECHNICAL SKILLS

- *Software:* Programming: C++, MATLAB, IDL, JAVA, PERL
  Data reduction and analysis: IRAF, IDL, MOPEX/APEX
  (worked with both IR/optical imaging data and spectroscopy)
  Operating Systems: UNIX/LINUX, WINDOWS, MAC
- *Lab:* Optics alignment. Operation of membrane deformable mirrors. Acquisition of data from quadriture polarized interferometer and Zygo interferometer (to test mirrors). Acquisition of data from scientific grade CCD devices. Control of spatial light modulators (SLMs) (*to the extent they can be controlled*).

HONORS AND AWARDS

- Jun. 2008: UCR Chancellor's Fellowship recipient
- Jun. 2008: UCR Dissertation Research Grant
- May 2008: Eaton Science Fiction Writing Award
- May 2006: IGPP Minigrant for Research
- Sep. 2003: UCR Dean's Fellowship recipient
- Jun. 2003: Senior Honors Thesis

PUBLICATIONS

1. **Laag, Edward A.**; Ammons, S. Mark; Gavel, Donald T; and Kupke, Renate; *"Multi-Conjugate Adaptive Optics Results from the Laboratory for Adaptive Optics MCAO/MOAO Testbed"*. 2008, Journal of the Optical Society of America - A, 25, 2114

2. **Laag, Edward A.**; Gavel, Donald T; Ammons, S. Mark; *"Open-Loop Woofer-Tweeter Control on the LAO Multi-Conjugate Adaptive Optics Testbed"*. 2007, Proceedings of the Sixth International Workshop on Adaptive Optics for Industry and Medicine, Editor: Christopher Dainty, (arXiv:0710.0405)

3. **Laag, Edward A.**; Canalizo, G.; van Breugel, W.; Gates, E.; de Vries, W.; and S. A. Stanford; *"Adaptive Optics Imaging Survey of Luminous Infrared Galaxies"*. 2006, The Astronomical Journal, 131, 2877

4. Ammons, S. Mark; **Laag, Edward A.**; Kupke, Renate; Gavel, Donald T.; Max, Claire E.; *"Enabling Laboratory Demonstrations of Multi-Object Adaptive Optics with Linearity Calibrations"*. 2007, Proc. SPIE, 6691, 669108

5. Ammons, S. Mark; Johnson, Luke; **Laag, Edward A.**; Kupke, Renate; Gavel, Donald T.; *"Laboratory Demonstrations of Multi-Object Adaptive Optics in the Visible on a 10 Meter Telescope"*. 2008, Proc. SPIE, 7015, 70150C

6. D. Gavel, M. Ammons, and **E. Laag**, *"A Comparison of Tomography Reconstruction Techniques for MCAO and MOAO: Theory and Laboratory Experience,"* in Adaptive Optics: Analysis and Methods Meetings on CD-ROM, OSA Technical Digest (CD) (Optical Society of America, 2007), paper AMA1

7. Ammons, S. Mark; Kupke, Renate; **Laag, Edward A.**; Gavel, Donald T.; Dillon, Daren R.; Reinig, Marco R.; Bauman, Brian J.; Max, Claire E.; Johnson, Jess A.; *"First Results from the UCSC Laboratory for Adaptive Optics Multi-conjugate and Multi-object Adaptive Optics Testbed"*. 2006, Proc. SPIE, 6272, 667202

TALKS

Dissertation Talk: *Introducing the MESS Catalog of Starburst Galaxies* AAS meeting, January 7 2009, Long Beach CA

Invited Talk: *Multi-conjugate AO Experiments on the LAO-MCAO Testbed* AO Seminar Series, November 18 2008, Berkeley CA

Talk: *Open-Loop Woofer-Tweeter Control on the LAO Multi-Conjugate Adaptive Optics Testbed*, Sixth International Workshop on Adaptive Optics for Industry and Medicine, June 2007, Galway Ireland

Talk: *MCAO Experiments on the LAO Multi-Conjugate Adaptive Optics Testbed*, Center for Adaptive Optics Fall Retreat, December 2006, Yosemite National Park CA

PAPERS IN PREPARATION

Laag, Edward A.; Canalizo, G.; Croft, S.; *"The Multiwavelength Extreme Starburst Sample of Luminous Infrared Galaxies Part One"*. 2009, –currently in prep.

PROFESSIONAL MEMBERSHIPS

- Center for Adaptive Optics (CfAO)
- American Astronomical Society (AAS)

OUTREACH

- *Inquiry Activity Leader*, CfAO — May 2006
  Akamai Maui Short Course in Adaptive Optics
- *Participant*, CfAO Professional Development Workshop — Feb. 2006
  Training in new teaching styles such as inquiry