

Charles W. Danforth, Ph.D.

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Profile

Data analyst, creative problem solver, team leader, deep generalist, and enthusiastic teacher with twenty years of experience at the top of his field. Thrives in collaborative, team-based environments that require careful, creative approaches to solving problems. Extensive writing and speaking experience to communicate complex, technical concepts to audiences of all levels.

Experience

Research Scientist - University of Colorado (2003-present)

Experimental astrophysics of intergalactic matter, galactic outflows, supermassive black hole ecology, background ionizing radiation, and numerous other topics. Extensive use of the Hubble Space Telescope and other space-based assets as well as ground-based observatories.

Observatory Director (Interim) - Sommers-Bausch Observatory - University of Colorado (2017)

Director of teaching, public outreach, and research activities at a university-level optical observatory.

University Instructor - University of Colorado (2012-present)

Instructor for a full spectrum of introductory, university-level astronomy courses on the solar system and planetary science, stellar and galactic astronomy, cosmology, and other topics.

Skills

Technical & Analytical

- **Software Development** - Lead the development of `coadd_x1d`, the only publicly-available pipeline software for the optimal reduction of Hubble Space Telescope/Cosmic Origins Spectrograph data. Developed and supported many additional data reduction and analysis packages. Extensive experience with IDL, Fortran, Unix, LaTeX; growing fluency with Python; familiarity with Perl, Mathematica, MatLab, and other packages. Fluent with Word, Excel, PowerPoint, etc.
- **Data Analysis & Database Management** - Produced the largest existing archive of extragalactic ultraviolet spectra. Developed `autolinefind` and `line_proc` codes for analysis of spectrographic data. Extensive imaging and time-domain analysis of astrophysical imaging and spectral data in multiple wavebands (optical, ultraviolet, X-ray, infrared).

Leadership & Management

- **Project Management** - Coordinated academic teaching teams of 3-10 graduate and undergraduate teaching assistants in support of my large university lecture classes; organized multiple laboratory and recitation sections, night observing sessions (2015-present). Supervised numerous research projects by undergraduate and graduate research students for small and medium-term projects (semester to multi-year scope) including technical, scientific, academic, and financial oversight.
- **Teamwork, Collaboration & Leadership** - Contributed broadly and significantly as team member of the HST/COS Science and Early Release Observations team (2008-2013) and the HST Spectral Legacy Working Group (2014-2016). Principle architect of the Quasar Absorption Line Survey project (Danforth et al. 2016) and key member of several recent scientific collaborations on galaxy groups, X-ray observations. Cross-disciplinary collaborative work with theorists, observers, simulators, and instrumentalists at many institutions around the world.

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Written & Oral Communications

- Technical Writing - Authored 15 peer-reviewed manuscripts in major journals. Contributed significantly to over 50 papers as a co-author. Lead significant advances in data visualization techniques and scientific analysis workflow. Developed numerous undergraduate lab exercises.
 - Grant Writing - Won multiple competitive grants from Space Telescope Science Institute, the Spitzer Science Center, and other national and international funding agencies and time allocation committees. Total grant funding as a Primary or Co-primary Investigator of approximately \$1M.
 - Oral Communications - Developed and taught university-level science courses (50-200 people) as well as smaller, topical classes and seminars (20-40 people). Ranked among highest in my department on course evaluations for student learning and interest amongst. Invited speaker at numerous conferences, department-level science colloquia, and public science talks. Specialized in relating intellectually challenging and counter-intuitive concepts to a lay audience via memorable and interesting means including extensive use of the state-of-the-art Fiske Planetarium and engaging demonstrations.
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Education

- Ph.D.** 2003 **Johns Hopkins University**, Baltimore, MD (Astrophysics)
M.A. 2000 **Johns Hopkins University**, Baltimore, MD (Astrophysics)
B.A. 1995 **Swarthmore College**, Swarthmore, PA (Astrophysics)
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Achievements, Awards, and Recognition

Select Grants Awarded (approximately \$1M total awards)

- “*Resolving the Circum-Nuclear Structure of the Radio Galaxy M87*”, **Hubble Space Telescope** guest observer program (2016, \$75k)
- “*Hot Gas in Spiral-Rich Galaxy Groups*”
Hubble Space Telescope (2015, \$250k)
- “*Probing Weak Intergalactic Absorption with Flaring Blazar Spectra*”
Hubble Space Telescope target-of-opportunity programs (2011, \$90k; 2012, \$120k)
- Various **Far Ultraviolet Spectroscopic Explorer** guest observer programs (2003-08, \$100k in total).
- Several successful **Spitzer Space Telescope** guest observer proposals (2007-09, \$158k in total)

Select Scientific Publications

- “*Far-UV Emission Properties of FRI Radio Galaxies*”, Danforth, et al. 2016 ApJ, 832, 76
- “*An HST/COS Survey of the Low-redshift IGM*”, Danforth et al. 2016 ApJ, 817, 111
- “*Fast Flare and Redshift Constraint for Blazar S50716+714*”, Danforth et al. 2013 ApJ, 764, 57

Select Speaking Invitations

- Departmental colloquia at U. Mass. Lowell (2015), Ohio University (2013), Texas A&M (2013)
 - “*Results from a Large IGM Survey with HST*”, U. Notre Dame (2014)
 - “*What are IGM Absorbers?*”, Leiden, NL (2009, 2013)
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Personal Interests

trail running, cycling, mountains, skiing, adventure writing, brewing, exploration