

David Wittman

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Education

- 1997 **University of Arizona**, *Ph.D.*, Astronomy.
- 1990 **Harvard University**, *A.B. cum laude*, Physics.

Employment

- 2020–current **Professor**, UNIVERSITY OF CALIFORNIA, DAVIS, Department of Physics and Astronomy.
- 2010–2020 **Associate Professor**, UNIVERSITY OF CALIFORNIA, DAVIS, Department of Physics.
- 2006–2010 **Assistant Professor**, UNIVERSITY OF CALIFORNIA, DAVIS, Department of Physics.
- 2004–2006 **Assistant Research Physicist**, UNIVERSITY OF CALIFORNIA, DAVIS.
- 1997–2004 **Member of Technical Staff**, BELL LABORATORIES, Murray Hill, NJ.

Books Authored

- 2021 **Data Analysis for Astrophysics**.
Teaching a graduate course on this topic highlighted the need for a textbook that interweaves statistics with astronomical instrumentation and detectors, context-rich examples, and best practices at coding in Python, which is becoming the dominant software language in astronomy. I wrote this book to help my students in this course, and have twice taught with it successfully.
- 2020 **Extragalactic Astrophysics**.
Most upper-division textbooks assume that students have completely mastered all of lower-division physics. This leaves many students overwhelmed, particularly transfer students who are also facing a transition from the semester system to the faster-paced quarter system. This as-yet unpublished textbook helps upper-division students practice applying lower-division concepts while applying them to, and learning about, physical systems outside our Galaxy. I have taught with it successfully.
- 2018 **The Elements of Relativity**, *Oxford University Press*.
Relativity is one of the great triumphs of physics and it fascinates non-physics students, but the standard physics curriculum completely overlooks this audience. I developed a passion for bringing relativity to thinkers who happen to have no physics background. This book includes all the best thinking tools I developed over a decade of teaching this topic as a *Topics in Physics* course as well as through the University Honors Program.

Research Articles

As of June 2024 I have 79 refereed papers and 292 nonrefereed publications, with 10,144 total citations and an h-index of 34. For your convenience I provide [this link to the full list on NASA's Astrophysics Data System](#) (once there you can change the sorting from by-citations to by-date).

Grants as Principal Investigator

- 2023-2026 **National Science Foundation**,
Discovery and Modeling of Merging Galaxy Clusters, \$353,236.
- 2024 **Goddard Space Flight Center**,
X-SORTER: X-ray Survey Of meRging clusTers in Redmapper (AO21), \$15,000.
- 2023-2025 **Space Telescope Science Institute**,
Four New Dissociative Merging Clusters, \$85,193.

- 2023-2025 **Goddard Space Flight Center,**
X-SORTER: X-ray Survey Of meRging clusTErs in Redmapper (AO22), \$102,423.
- 2023 **Goddard Space Flight Center,**
X-SORTER: X-ray Survey Of meRging clusTErs in Redmapper (AO20) , \$14,994.
- 2019–2022 **National Science Foundation,**
Using Velocity Fields to Improve Gravitational Lensing Mass Measurements of Galaxies and Galaxy Clusters,
\$212,369.
- 2015–2019 **National Science Foundation,**
Anatomy of a Merger: Understanding the Dynamics of Galaxy Cluster Mergers, \$346,101.
- 2013–2015 **Space Telescope Science Institute,**
Probing Dark Matter with a New Class of Merging Clusters, \$127,870.
- 2008–2012 **Large Synoptic Survey Telescope (LSST) Corporation,**
Shear Analysis of the LSST Dataset, \$458,070.
- 2007–2008 **Spitzer Space Telescope Science Center,**
Shear-Selected Galaxy Clusters: Stellar Mass Content and Star Formation History, \$49,900.
- 2007 **LSST Corporation,**
Weak Lensing Computing Requirements, \$70,000.
- 2005–2010 **NASA,**
Probing Dark Matter and Dark Energy with Shear-Selected Clusters of Galaxies, \$769,544.
- 2004—2006 **Space Telescope Science Institute,**
Probing the Mass Distribution at High Redshift in the Hubble Space Telescope Ultra-Deep Field, \$81,300.

Honors and Awards

- 2023 **Chancellor's Fellow For Diversity, Equity & Inclusion, UC Davis.**
- 2019 **Nominated for the Dwight Nicholson Medal for Outreach, American Physical Society.**
- 2018 **Nominated for the Chancellor's Achievement Award for Diversity and Community, UC Davis.**
- 2015–2016 **Fulbright Scholar, Fulbright Program, Institute for International Education.**
- 2007 **Nominated for Excellence in Education award, Associated Students of UC Davis.**
- 1993 **Graduate Scholarship in Optical Engineering, Society of Photo-optical Instrumentation Engineers.**
- 1988–1990 **John Harvard Scholar, Harvard College.**
- 1986–1990 **National Merit Scholar, National Merit Scholarship Corporation.**

Invited Talks at Scientific Meetings

- 2023 **A New Generation of Optically Selected Mergers, Yonsei Merging Cluster Workshop, Seoul, South Korea, December 2023.**
- 2017 **Toward Better Merger Modeling, Workshop on Self-interacting Dark Matter, Copenhagen, Denmark, August 2017.**
- 2017 **Merging Galaxy Clusters as Dark Matter Colliders, PATRAS Workshop on Axions, WIMPS, and WISPS, Thessaloniki, Greece, May 2017.**
- 2016 **Dark Matter in Galaxy Clusters: Past, Present, and Future, National Astronomy Teaching Summit, San Francisco, August 2016.**
- 2016 **Dark Matter in Galaxy Clusters: Past, Present, and Future, American Association of Physics Teachers annual meeting, Sacramento, July 2016.**
- 2015 **Merging Galaxy Clusters as Dark Matter Colliders, Dark Matter-Cairo, Cairo, December 2015.**
- 2014 **Designing and Running a Graduate Admissions Boot Camp, American Physical Society Bridge Program Summer Meeting, College Park, MD, June 2014.**

- 2011 **Invited lecturer**, *Summer School & Workshop: Weak and Strong Gravitational Lensing*, Beijing, China, July 2011.
- 2011 **Future Large Optical Surveys**, *First International Symposium of Science with the SOAR Telescope*, Maresias Beach, Brazil, May 2011.
- 2010 **Shaping Attitudes Toward Science in an Introductory Class**, *Summer Institute on Teaching and Technology*, Davis, CA, June 2010.
- 2009 **Weak Lensing Surveys in the Next Decade**, *Dark Side of the Universe '09*, Melbourne, Australia, June 2009.
- 2009 **Weak Lensing Surveys**, *3rd International Workshop on the Interconnection between Particle Physics and Cosmology*, Oklahoma University, May 2009.
- 2008 **Systematics in Future Surveys**, *DUEL (Dark Universe with Extragalactic Lensing) meeting*, Victoria, BC, June 2008.
- 2007 **A Consumer's Guide to Future Weak Lensing Surveys**, *Dark Side of the Universe '07*, Minneapolis, MN, June 2007.
- 2007 **Large Synoptic Survey Telescope**, *Probing the Universe with Weak Lensing Surveys meeting*, Marseilles, France, April 2007.
- 2006 **(A Consumer's Guide to) Weak Lensing Surveys**, *COSMO 06*, Lake Tahoe, CA, September 2006.
- 2006 **Statistical and Computational Challenges in Large Astronomical Surveys**, *Opening Workshop, Spring 2006 Program on Astrostatistics*, Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC, January 2006.
- 2005 **Large Synoptic Survey Telescope**, *Workshop on Probing the Dark Universe with Subaru and Gemini*, Waikoloa, HI, November 2005.
- 2005 **Large Synoptic Survey Telescope Simulations**, *Supernova Acceleration Probe meeting*, Lawrence Berkeley National Laboratory, June 2005.
- 2005 **Weak Lensing with the Blanco 4-m**, *Dark Energy Survey meeting*, Fermilab, May 2005.
- 2005 **Large Synoptic Survey Telescope Simulations: From High Redshift to the Top of the Atmosphere**, *Large Synoptic Survey Telescope Simulation Meeting*, UC Davis, March 2005.
- 2005 **Weak Lensing Science Requirements**, *Large Synoptic Survey Telescope Science Requirements Meeting*, Stanford Linear Accelerator Center, March 2005.
- 2004 **Weak Lensing Requirements on an Atmospheric Dispersion Compensator**, *Large Synoptic Survey Telescope Atmospheric Dispersion Compensator Meeting*, Stanford Linear Accelerator Center, September 2004.
- 2004 **Shear-Selected Clusters from the Deep Lens Survey**, *Workshop on Studies of Dark Energy and Cosmology from X-ray Cluster Surveys*, Greenbelt, MD, Jan. 15, 2004.
- 2003 **The Large Synoptic Survey Telescope**, *Institute for Nuclear and Particle Astrophysics and Cosmology*, San Diego, Oct. 4, 2003.
- 2003 **Shear-Selected Clusters from the Deep Lens Survey**, *Stanford Linear Accelerator Center Summer Science Institute*, Aug. 8, 2003.
- 2000 **Weak Lensing by Large-Scale Structures**, *Princeton/PUC Dark Matter Workshop*, San Pedro de Atacama, Chile, July 2000.

Seminars, Colloquia, Contributed Talks

- 2023 **Merging Galaxy Clusters as Dark Matter Colliders**, *Munich Dark Matter Seminar Series at Max Planck Institute for Astrophysics*, October 2023.
- 2023 **Large Dark Matter Colliders**, *Leiden University, Netherlands*, October 2023.
- 2022 **Observing Dark Matter in the Wild**, *Sonoma State Physics & Astronomy Colloquium*, September 2022.

- 2021 **Open Questions in Astrophysics**, *UC Davis Physics and Astronomy Department*, November 2021.
- 2016 **Overconfidence: Diagnosis and Steps Toward Treatment**, *National Astronomy Teaching Summit*, San Francisco, August 2016.
- 2016 **Merging Galaxy Clusters as Dark Matter Colliders**, *Leiden Observatory*, Leiden, Netherlands, April 2016.
- 2016 **Merging Galaxy Clusters as Dark Matter Colliders**, *Hamburg University*, Hamburg, Germany, April 2016.
- 2016 **Merging Galaxy Clusters as Dark Matter Colliders**, *University of Coimbra*, Coimbra, Portugal, March 2016.
- 2016 **Merging Galaxy Clusters as Dark Matter Colliders**, *Instituto de Astrofísica*, Lisbon, Portugal, October 2016.
- 2015 **Merging Cluster Collaboration: Dynamics of 25 Radio-Selected Mergers**, *Snowcluster 2015–The Physics of Galaxy Clusters*, Snowbird, UT, March 2015.
- 2013 **Merging Galaxy Clusters and the Nature of Dark Matter**, *Kansas State University Physics Department*, Manhattan, KS, September 2013.
- 2013 **Cosmology & Dark Matter Panel**, *INPAC–MRPI General Meeting*, Asilomar, CA, April 2013.
- 2016 **Merging Galaxy Clusters and the Nature of Dark Matter**, *Cerro Tololo Inter-American Observatory*, La Serena, Chile, January 2013.
- 2012 **Massive Sky Surveys in the Coming Decade**, *Physics Colloquium*, California State University, Sacramento, September 2012.
- 2009 **MultiFit Overview**, *LSST Weak Lensing meeting*, Princeton, NJ, August 2009.
- 2009 **MultiFit Overview**, *LSST Galaxies Collaboration meeting*, Tucson, AZ, May 2009.
- 2008 **Redshift Distributions and $p(z)$** , *Photometric Redshift Accuracy Testing meeting*, IPAC/Caltech, Pasadena, December 2008.
- 2008 **Stacking and MultiFit**, *LSST Data Management Applications Meeting*, IPAC/Caltech, Pasadena, February 2008.
- 2008 **Massive Sky Surveys of the Next Decade**, *Sonoma State Physics Colloquium*, Rohnert Park, CA, Feb. 4, 2008.
- 2007 **Massive Astronomy Surveys in the Next Decade**, *UC Berkeley Neyman Statistics Seminar*, Berkeley, CA, October 10, 2007.
- 2007 **Cosmic Shear with the Deep Lens Survey**, *Cosmology in Northern California*, Davis, CA, May 8, 2007.
- 2006 **Weak Lensing**, *LSST All-Hands Meeting*, Tucson, AZ, December 4, 2006.
- 2006 **Large Optical Astronomy Surveys**, *UC Davis Statistics Colloquium*, November 30, 2006.
- 2006 **Shear-Selected Clusters from the Deep Lens Survey**, *UC Berkeley Astrophysics Seminar*, Berkeley, CA, September 5, 2006.
- 2006 **Shear-Selected Clusters from the Deep Lens Survey**, *Fermilab Astrophysics Seminar*, Batavia, IL, May 22, 2006.
- 2006 **Weak Lensing Cosmology: Past, Present, and Future**, *UC Davis Cosmology Seminar*, Davis, CA, February 21, 2006.
- 2005 **Shear-Selected Clusters from the Deep Lens Survey**, *Stanford Linear Accelerator Center seminar*, Palo Alto, CA, November 3, 2005.
- 2004 **Shear-Selected Clusters from the Deep Lens Survey**, *UC Santa Cruz colloquium*, Santa Cruz, CA, April 28, 2004.
- 2003 **The Deep Lens Survey**, *Stanford Linear Accelerator Center seminar*, Palo Alto, CA, May 7, 2003.
- 2003 **The Deep Lens Survey**, *UC Davis Cosmology Seminar*, Davis, CA, March 12, 2003.

- 2002 **The Deep Lens Survey**, *Society of Photo-Optical Instrumentation Engineers*, Waikoloa, HI, August 2002.
- 2001 **Detecting Cosmic Shear**, *Stanford Linear Accelerator Center*, Palo Alto, CA, Feb. 6, 2001.
- 2001 **Detecting Cosmic Shear**, *Lawrence Berkeley National Laboratory*, Berkeley, CA, Feb. 8, 2001.
- 2001 **Detecting Cosmic Shear**, *Rutgers University Astrophysics Seminar*, Piscataway, NJ, March 8, 2001.
- 2000 **Frontiers in Weak Gravitational Lensing**, *Bell Labs Physical Sciences Research Seminar*, Murray Hill, NJ, May 16, 2001.
- 2000 **Detecting Cosmic Shear**, *Institute for Advanced Study*, Princeton, NJ, March 2000.
- 2000 **The Normal Cluster Weak Lensing Survey: Masses, Mass Profiles, and M/L Ratios of Ten Clusters at $z \approx 0.2$** , *conference on Constructing the Universe with Clusters of Galaxies*, Paris, July 2000.
- 1999 **Weak Lensing with the Big Throughput Camera**, *National Observatory*, Rio de Janeiro, Brazil, May 4, 1999.
- 1999 **The Shear Correlation Function Out to 20'**, *conference on Gravitational Lensing: Recent Progress and Future Goals*, Boston University, July 28, 1999.
- 1998 **Big Throughput Camera: The First Year**, *SPIE Conference on Large Telescopes and Instrumentation*, Kona, Hawaii, March 1998.
- 1996 **A Hitchhiker's Guide to M33**, *Lawrence Livermore National Laboratory*, Livermore, CA, November 1996.
- 1996 **A Hitchhiker's Guide to M33**, *Bell Laboratories*, Murray Hill, NJ, November 1996.
- 1994 **High-resolution infrared imaging utilizing a tip-tilt secondary mirror**, *SPIE Conference on Large Telescopes and Instrumentation*, Kona, Hawaii, March 1994.

Other Talks

I have given 28 talks for the public and/or for K12 schools and teachers.

Courses Taught

For non-scientists

- FRS2, FRS4 **First-year Seminar: Scientific Reasoning** (aka Mythbusting)
- Astronomy **Stars, Galaxies, Universe** (nominated for the Associated Students of UC Davis Excellence in Education award; also taught as an honors course for the University Honors Program)
- 10G
- Astronomy **Solar System**
- 10S
- Physics 10, **Relativity and Gravity** (IST is Integrated Studies, part of the University Honors Program)
- IST 8A

Introductory

- Physics 9C **Electricity and Magnetism**

Upper division

- Physics 110L **Electricity & Magnetism Computation Lab**
- Physics 153 **Extragalactic Astrophysics**
- Physics 154 **Topics in Astrophysics**
- Physics 155 **General Relativity**
- Physics 156 **Introduction to Cosmology**
- Physics 198 **Group Study.** I led physics majors in creating animations to help beginners grasp physical principles important for understanding astronomy. The [resulting animations](#) are used by astronomy educators nationwide and benefit not only the general education students who use the animations, but also the physics majors who deepened their understanding of physics in the process.

Graduate

- Physics 250 **Foundations of Astrophysics and Cosmology**
- Physics 250 **Weak Gravitational Lensing**
- Physics 250 **Cosmology with Galaxy Surveys**
- Physics 265 **High Energy Astrophysics**
- Physics 266 **Data Analysis for Astrophysics**

International

Instructor 2011 Beijing Summer School on Gravitational Lensing

Research mentoring

PhD Dissertations Supervised

- 2026 **A New Generation of Optically Selected Merging Galaxy Clusters** (tentative title) by Chris Hopp
- 2025 **Merging Clusters as Probes of Dark Matter** (tentative title) by Rodrigo Stancoli
- 2018 **Merging Galaxy Clusters: A Case Study of ZwC12341.1+0000 and the Development of a New Forward Modeled Lensing Technique** by Bryant Benson
- 2018 **Observations and Modeling of Merging Galaxy Cluster** by Nathan Golovich
- 2016 **Probabilistic Inference of Dark Matter Properties in Galaxy Clusters and the Cosmic Web** by Yin-Yee (Karen) Ng
- 2013 **Constraining Dark Matter Through the Study of Merging Galaxy Clusters** by William Dawson

Other

2006–present I have mentored three postdoctoral researchers, two MS students, 45 undergraduates and one precocious high school student in research since joining the UCD faculty in 2006.

Major Outreach Activities

I am a founding member of the steering committee of Cal-Bridge North, a program to help diverse undergraduates thrive in physics/astronomy and bridge up to PhD programs. I also mentor students for Cal-Bridge (all three of my students have successfully entered PhD programs). I also run workshops for Cal-Bridge, and serve on the graduate committee, which reads and provides feedback to students on their application essays and choices of programs to apply to. I have also mentored two students in UC Davis' MURPPS (Mentorships for Undergraduate Research Participants in the Physical and Mathematical Sciences) program. *Additional EDI activities are described in my candidate statement.*

I am the founder of the California Graduate Physics Admissions Boot Camps and organizer of the northern California camp, 2010–2012 and 2016–present. These camps inform and prepare undergraduate students to expand their career options in physics, at no charge to them.

I participate in many outreach/recruitment events at UC Davis, such as MPS (Mathematical and Physical Sciences) Day in 2017 (which I helped plan and run), Envision UC Davis in 2018, the UC LEADS annual meeting in 2017, and Grad Scoop in 2018 and 2019.

- 2007–2018 Coordinator for Astronomy and Solar System events at Sacramento Regional Science Olympiad
- 2011–2013 Scientist in Residence, Peregrine School (an innovative elementary school), Davis, CA
- 2011,2014 Faculty member for COSMOS (California State Summer School for Mathematics and Science)
- 2010–2011 Docent educator at Cameron Park Rotary Community Observatory
- 2009–2011 Visiting Scientist, Peregrine School, Davis, CA

Minor and less recent activities are omitted here for brevity.

Service

Service to the scientific community

- 2019–2023 Time Allocation Committee, University of California Observatories
- 2019–2022 University of California Observatories Advisory Committee
- 2016–present proposal reviewer for NASA; NSF; Chile’s Millenium Science Initiative; Israeli Science Foundation; and the Dutch Research Council (NWO)
- 2000–present Referee for publications including *Science*, *Astronomy & Astrophysics*, *Astrophysical Journal*, *Astrophysical Journal Letters*, and *Monthly Notices of the Royal Astronomical Society*. I typically review about three papers each year.
 - 2022 proposal reviewer for the Giant Metre-wave Radio Telescope
- 2008, 2017, 2021 reviewer/panelist for National Science Foundation grants
- 2015–2019 Proposal reviewer, Fulbright Commission Portugal (also Fulbright panelist for UC Davis in 2021)
- 2018 Book proposal reviewer, Oxford University Press
- 2015 Reviewer/panelist for NASA WFIRST awards
- 2014 Reviewer, *21st Century Astronomy* textbook, fourth edition
- 2000–2014 Deep Lens Survey public data release and support <http://dls.physics.ucdavis.edu>
- 2007–2013 Co-chair, LSST Weak Lensing Science Collaboration
 - 2013 External reviewer, Dark Energy Survey operational readiness review
 - 2010 Panelist, National Optical Astronomy Observatories (NOAO) Survey Program Review
 - 2009 External reviewer, SDSS-3 hardware Critical Design Review
 - 2009 Reviewer, *21st Century Astronomy* textbook, third edition
 - 2008 Proposal reviewer, France Berkeley Fund
 - 2008 Reviewer/panelist for NSF CAREER awards
 - 2005 Chair, Weak Lensing Working Group, LSST Science Requirements meeting
- 2004–2005 represented LSST on a joint LSST/SNAP statement of complementarity
- 2001–2004 Deep Lens Survey liaison for the Hands-On Universe educational project
- 2002–2004 Member, Bell Labs Research Computing Support Committee
- 2002–2004 Founder and organizer, Bell Labs Astrophysics Journal Club
- 2002–2003 Member, LSST Data Working Group, a panel charged by NOAO to determine if and how it was feasible to manage and do science with the immensely large planned LSST dataset
- 1999–2001 Founder and maintainer of the LSST website <http://www.lsst.org>
- 1997–2000 Observing and data reduction support for community users of the Big Throughput Camera on the Cerro Tololo Inter-American Observatory 4-m telescope

Department and university service

I omit most of these for brevity. I include just a few highlights of campus service here.

- 2012–present instructor and mentor for the University Honors Program
- 2020–present College of Letters and Science Graduate Student Support Committee (currently chair)
- 2019–present Undergraduate Instruction Program Review Committee
 - 2016–2019 Graduate Program Review Committee
 - 2017–2020 College of Letters and Science Awards Committee (chair 2019-2020)
 - 2014–2015 chair of the First-Year Experience subcommittee for improving undergraduate education at UCD
 - 2012–2015 Campus Judicial Board 2012-2015