Jes Ford

Curriculum Vitae

eScience Institute, University of Washington, Campus Box 351570, Seattle, WA 98195
email: jesford@uw.edu | *cell:* 206.446.6874 | *website:* http://jesford.github.io

PROFILE

Physics Ph.D. and science educator, with expertise in data science, statistical modeling, astronomy, and effective educational pedagogy.

EDUCATION

Postdoctoral Fellow Data Science — Current
eScience Institute & Department of Astronomy
University of Washington (UW), Seattle
- Moore/Sloan & WRF Innovation in Data Science Postdoctoral Fellowship

Ph.D. Physics — August 2015
University of British Columbia (UBC), Vancouver
Thesis Title: *Galaxy Cluster Studies with Weak Lensing Magnification and Shear.*
- Doctoral Four-Year-Fellowship Award
- Graduate Entrance Scholarship Award

B.Sc. Physics, Math Minor, *Summa Cum Laude* — May 2008
University of Nevada, Reno
- Westfall Scholar Award: highest GPA in physics (3.985/4.0)
- Regents' Scholar Award: $5000 prize awarded "in recognition of outstanding academic achievements, leadership ability, & service contributions."

ACADEMIC RESEARCH

Moore/Sloan Data Science Postdoctoral Fellowship — Sept 2015
Postdoctoral Researcher at the eScience Institute, bridging the gap between traditional astronomical research and data science techniques including machine learning.

UBC Department of Physics & Astronomy — 2009 - 2015
Graduate Research Assistant: developed new gravitational lensing techniques and constrained dark matter distributions, while working in international collaborations.
- Complex model building, fit optimization, bootstrapping, systematic bias testing, uncertainty estimation and propagation, parallel processing.
- Member of CFHTLenS collaboration, which produced the first and *only* publicly available weak gravitational lensing shear catalog: cfhtlens.org
- Publicly released new astronomical catalog of galaxy clusters.
- Peer-reviewed publications: 3 first-author & 1 co-author journal articles.

Nevada Terawatt Facility Reno, NV — 2006 - 2008
Undergraduate Research Assistant: laboratory astrophysics, developed novel design for high-energy shock wave experiment, co-authored 2 peer-reviewed publications.

NASA Jet Propulsion Laboratory Pasadena, CA — Summer 2007
Summer Undergraduate Research Fellowship: ran gravitational lensing simulations to quantify scientific impact of telescope mirror size, for mission cost-benefit analysis. Publicly released resulting MirrorSTEP simulations.

LEARNING OUTSIDE THE BOX

Big Data Analytics JPL-Caltech Virtual Summer School — Sept 2014
Two-week intensive online summer school focused on big data analysis, machine learning, databases, visualization, statistical resampling and inference, and more.

Intro to Data Science University of Washington/Coursera — June - Sept 2014
8-week online course, with project-based learning of data science. Experience with SQL, MapReduce, Twitter API, Kaggle, AWS, machine learning, visualization.

Big Data Mentorship Group *with mentor from Hootsuite* Mar - June 2014
Small group projects on machine learning in Python, streaming Twitter data, Natural Language Processing for sentiment analysis, using Redis (NoSQL) databases.

Data-Relevant UBC Courses: Machine Learning & Data Mining, Intro to Relational Databases, Advanced Statistics for Astronomers.

Meetup Groups: Data Science, Python User Group, PyLadies, Big Data Developers, Girl Dev, Code & Coffee.

Astronomy Education Workshop: Attended the inaugural Center for Astronomy Education's Legacy Workshop on effective teaching for grad students and postdocs (2011).

COMPUTER SKILLS

Languages & Tools: Python, C, IDL, SQL, MapReduce, HTML, R, Git, bash/csh, LaTeX
Operating Systems: OS X, Linux

LEADERSHIP

Site Host: Software+Data Carpentry Instructor & Helper Retreat 2015
Organized and hosted the Seattle site for this worldwide event on sharing resources and improving teaching techniques and materials for Software Carpentry Workshops.

Lead Organizer: Graduate Student Career Workshop 2013
Planned and coordinated a full day career-oriented workshop for graduate students at the Canadian Astronomical Society annual conference.

Coordinator: Cosmology Group Weekly Seminar 2012 - 2014
Organized and chaired weekly talks and discussions of recent papers or hot topics in cosmology, for faculty/postdocs/graduate students at UBC.

Co-captain: Graduate Physics & Astronomy Softball Team 2011 - 2015

PUBLICATIONS

J. Ford, J. Stang, C. Anderson. *Simulating Gravity: Dark Matter and Gravitational Lensing in the Classroom.* The Physics Teacher 53, 557 (2015).

J. Ford +19 coauthors. *CFHTLenS: A Weak Lensing Shear Analysis of the 3D-Matched-Filter Galaxy Clusters.* Monthly Notices of the Royal Astronomical Society, 447, 4 (2015).

J. Ford, H. Hildebrandt, L. Van Waerbeke, T. Erben, C. Laigle, M. Milkeraitis, C. Morrison. *Cluster Magnification & the Mass-Richness Relation in CFHTLenS.* Monthly Notices of the Royal Astronomical Society, 439, 4 (2014).

J. Ford, H. Hildebrandt, L. Van Waerbeke, A. Leauthaud, P. Capak, A. Finoguenov, M. Tanaka, M. George, J. Rhodes. *Magnification by Galaxy Group Dark Matter Halos.* Astrophysical Journal 754, 143 (2012).

L. Van Waerbeke, H. Hildebrandt, **J. Ford**, M. Milkeraitis. *Magnification as a Probe of Dark Matter Halos at High Redshift.* Astrophysical Journal 723, 1 (2010).

S. Neff, **J. Ford**, S. Wright, D. Martinez, C. Plechaty, R. Presura. *Magnetically Accelerated Foils for Shock Wave Experiments.* Astrophysics and Space Science 322 (2009).

S. Neff, S. Wright, **J. Ford**, R. Royle, R. Presura. *Faraday Cup Measurements of the Energy Spectrum of Laser-Accelerated Protons.* IEEE Trans. Plasma Science 36 (2008).

CONFERENCE PRESENTATIONS

2015 *Poster*, Weak Lensing Systematics Workshop, UC Davis

2015 *Talk*, SnowCLUSTER: The Physics of Galaxy Clusters, Snowbird/Univ. of Utah

2015 *Talk*, American Astronomical Society (dissertation talk), Seattle, WA

2013 *Invited Talk*, Weak Lensing Magnification Conference, Universitat Autonoma, Barcelona

2013 *Talk*, Canadian Astronomical Society (CASCA) Annual Meeting, Univ. of British Columbia

2013 *Talk*, SnowCLUSTER: The Physics of Galaxy Clusters, Snowbird/Univ. of Utah

2012 *Talk*, SnowPAC: Gravitational Lensing in the Age of Survey Science, Snowbird/Univ. of Utah

2012 *Poster*, Essential Cosmology for the Next Generation, Cancun, Mexico (BCCP)

2010 *Poster*, Dark Universe through Extragalactic Lensing (DUEL): 10 Years of Cosmic Shear, Univ. of Edinburgh

2008 *Poster*, National Nuclear Security Administration (NNSA) Stockpile Stewardship Academic Alliance Program, Washington DC

2008 *Poster*, Nevada Undergraduate Research Symposium, Univ. of Nevada

2008 *Poster*, National Conference on Undergrad. Research, Salisbury Univ. (Maryland)

2007 *Talk*, Shear TEsting Programme (STEP) Workshop, NASA Jet Propulsion Lab

2007 *Talk*, National Conference on Undergrad. Research, Dominican Univ. of California

TEACHING & OUTREACH

Software Carpentry Instructor & Helper at eScience Institute 2015
Teaching technical computing skills to scientists, including Bash, Python, and Git/GitHub. Enrolled in official Software Carpentry Teaching Certification in January 2016.

Phenomenal Physics Summer Camp Instructor at UBC 2013 - 2015
Coordinated with other science instructors and camp counselors to plan, prepare and deliver physics & astronomy curriculum for multiple parallel sessions of camp.

Future Science Leaders Fellow at Science World, Vancouver 2013 - 2014
Co-designed FSL physics/astronomy curriculum and taught 3 interactive sessions for gifted high school students (+45 hours as volunteer FSL mentor in 2012). Curriculum recorded for future use at Science World, and submitted to a physics teaching journal.

Graduate Teaching Assistant (TA) at UBC 2009 - 2014
Lectured, facilitated group problem-solving sessions and directed lab experiments for undergraduate physics and astronomy courses (14 semester courses).

- Mentor TA: worked one-on-one with new TAs to encourage best teaching practices, performed peer-observations and gave teaching evaluations.
- Head TA for Intro to Physics: managed $\sim$30 TAs, co-organized weekly meetings and content to prepare TAs to teach upcoming labs and tutorials.
- Participated in multiple workshops and courses for effective evidence-based science instruction.

Classroom Presentations: Developed and delivered classroom presentations and interactive activities for Vancouver area students: (1) *Scientists & Innovators in the Schools* Science World program (2012-2014); (2) *Experience Science Day* for downtown east-side students (2013); (3) *Westcoast Women in Engineering, Science, & Technology* workshop (2013). Lesson plans documented for future outreach use.

Other Outreach: *Let's Talk Science* Volunteer of the Month for co-planning and co-presenting a trades-themed science stage-show at the Skills Canada National Convention (June 2013); *Greater Vancouver Regional Science Fair* judge (2012-2014); multiple presentations given to undergraduate and graduate students.

INTERESTS Snowboarding (former sponsored athlete), hiking, softball, disc golf, camping, music

RESEARCH REFERENCES

Ludovic Van Waerbeke, Associate Professor (PhD Supervisor)
Physics & Astronomy Department at UBC
waerbeke@phas.ubc.ca 604-822-5515

Jason Rhodes, JPL Scientist
NASA Jet Propulsion Laboratory / Caltech
jason.d.rhodes@jpl.nasa.gov 818-354-3304

Douglas Scott, Professor
Physics & Astronomy Department at UBC
dscott@phas.ubc.ca 604-822-2802