Jill P. Naiman

Teaching Assistant Professor (iSchool, UIUC)
Visiting Scholar (NCSA)
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astronaiman.com

RESEARCH INTERESTS

Visualization: development of visualization and storytelling tools for early-to-late career scientists, data visualization curriculum development

Multidisciplinary information science: digitization of scientific images - OCR and image classification, image processing, and artifact detection for scientific images

Outreach and Inclusion: co-development of hardware and software for the Maker community, inclusion of under represented minorities in the STEAM fields, introductory science activities for girls

Hardware: startup prototyping and testing, development of interactive LED art pieces

WORK EXPERIENCE

School of Information Sciences, UIUC - *Teaching Assistant Professor*
AUGUST 2020 - PRESENT

- Courses taught: IS452 (Intro to programming), IS542 (Statistics), IS590 (Data Visualization)
- Mentoring: IS592 - applied data analysis and visualization
- Online and in-person teaching

School of Information Sciences, UIUC - *Adjunct Lecturer*
AUGUST 2018 - MAY 2020

- Online and in-person teaching

National Center for Supercomputing Applications, UIUC - *Visiting Scholar*
APRIL 2016 - PRESENT

- Collaboration with the Advanced Visualization Lab on software development and visualization production

World Wide Telescope, UIUC/Cambridge, MA - *Software Developer*
JULY 2019 - PRESENT

- Integration of citizen science image labeling workflow with online archiving and digitization webpages

Harvard Pre-College Program, Cambridge, MA - *Instructor*
JULY - AUGUST 2019; JUNE - JULY 2020

- Introduction to computational astronomy and data visualization intensive summer course for high school students

Harvard-Smithsonian Center for Astrophysics, Cambridge, MA - *Institute of Theory and Computation Postdoctoral Fellow*
AUGUST 2017 - AUGUST 2018

- Astrophysics and visualization research

Harvard-Smithsonian Center for Astrophysics, Cambridge, MA - *National Science Foundation Postdoctoral Fellow*
AUGUST 2014 - AUGUST 2017

- Astrophysics and visualization research

Dr. Andrea Ghez's Galactic Center Group, UCLA, CA - *Undergraduate Researcher*
JULY 2005 - JULY 2006

- Analyzed IR spectral data to calculate radial velocities of stars orbiting the galactic center

EDUCATION

Astronomy & Astrophysics, University of California, Santa Cruz, CA - *M.S., Ph.D.*
SEPT 2007 - MAY 2014

Physics Masters Student, University of California, Santa Cruz, CA
SEPT 2006 - SEPT 2007

Astronomy & Astrophysics, University of Los Angeles, CA - *B.S.*
SEPT 2002 - JUNE 2005

Foothill Community College, Los Altos, CA - *A.A.*
SEPT 2000 - MAY 2002

CURRICULUM DEVELOPMENT AND TEACHING

Full Semester Courses - Graduate

IS542 - Data, Statistical Models, and Information (online)
UIUC, SPRING & FALL 2020

IS590DV - Data Visualization (in-person/online)
UIUC, SPRING & FALL 2020

IS542 - Data, Statistical Models, and Information (online)
UIUC, FALL 2019

IS452 - Foundations of Information Processing (online)
UIUC, FALL 2019

IS542 - Data, Statistical Models, and Information
UIUC, SPRING 2019

IS590DV - Data Visualization (online, https://uiuc-ischool-dataviz.github.io/spring2019online/)
UIUC, SPRING 2019

IS542 - Data, Statistical Models, and Information (online)
UIUC, FALL 2018

Mentoring

Graduate Research Project: Data Analysis and Visualization
iSCHOOL, UIUC, AUGUST 2019-PRESENT

- Mentoring an iSchool LIS student analyzing effects of climate change African crop yields
- Mentoring an iSchool IM student on document analysis and machine learning text/image classification
- Introductory machine learning methods, data visualization

Undergraduate Research Projects: Computational Astrophysics and Visualization
HARVARD SMITHSONIAN CENTER FOR ASTROPHYSICS, AUGUST 2016 - PRESENT

- Advisor to two undergraduate Aztlán Institute students

Undergraduate Research Theses: Computational Astrophysics and Visualization
UNIVERSITY OF CALIFORNIA, SANTA CRUZ, SEPTEMBER 2008 - JULY 2014

- Advisor of nine undergraduates on their thesis research

Summer Courses - Undergraduate

CSCI-P-14110 - Introduction to Programming, Computational Science, and Data Visualization
HARVARD, SUMMER 2020

- 30 hour course equivalent
- Full materials: https://jnaiman.github.io/csci-p-14110_su2020/

CSCI-P-14110 - Introduction to Programming and Data Visualization
HARVARD, SUMMER 2019

- 30 hour course equivalent
- Full materials: https://jnaiman.github.io/csci-p-14110_su2019/

Introduction to Computational Astronomy and Data Visualization
HARVARD BANNEKER & AZTLÁN INSTITUTES, SUMMER 2016; SUMMER 2017

- 12 hour course equivalent
- REU program for undergraduates of color in physics and astronomy (https://bannekerinstitute.fas.harvard.edu), this course was part of a 10-week series
- Full materials: http://www.astroblend.com/ba2017/ and http://www.astroblend.com/ba2016/

***LAMAT* Python Programming Bootcamp for Transfer Students**
UNIVERSITY OF CALIFORNIA, SANTA CRUZ, SUMMER 2014

- ~28 hour course equivalent
- Inquiry based program for introductory Python projects, including Raspberry PI's, scientific simulations, and three dimensional data visualization

Workshops - Continuing Education

Data Harvesting: Homegrown Data Analysis for Agriculture
UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN, FEBRUARY 2019 & MARCH 2019

- Two, two-day workshops geared to small farmers, agronomists and CCAs
- Full workshop materials accepted to Carpentries Incubator: https://github.com/carpentries-incubator/data-harvesting-for-agriculture

Workshops - Undergraduate/All ages

Programming Fundamentals Workshop
UNIVERSITY OF CALIFORNIA, SANTA CRUZ, SUMMER 2013

- 3 day workshop for community college transfer students
- Inquiry based Python instruction

Sew Your Own Circuit Workshop at GeekGirlCon
SEATTLE, WA, OCTOBER 2012, 2015, 2017

- 1.5 hour, inquiry based activity to introduce girls and women to electronic circuits with sewable LEDs and conductive thread
- Slides, photos and material list available: http://avriot.com/educational_materials/ggc2015.html

Visualizing Astronomy Workshop
UNIVERSITY OF CALIFORNIA, SANTA CRUZ, FALL 2011

- 2.5 day, inquiry based teaching for mixed class of science and art undergraduates
- mixed groups used Arduinos to produce hands-on scientific art installations through a process of data acquisition, analysis, and data visualization

Other Teaching

Instructor, *yt* user's meeting
NCSA, 2016

Instructor, Santa Cruz Jail Inmate Education project
SANTA CRUZ, CA, 2010-2013

Guest lecturer, DANM 133 Electronics Class
UNIVERSITY OF CALIFORNIA SANTA CRUZ, CA, 2012

Co-instructor, Astronomy 202, Graduate level “Radiative Processes” (Quarter-long)
UNIVERSITY OF CALIFORNIA SANTA CRUZ, CA, 2012

Teaching Assistant, "Introduction to the Cosmos"
UNIVERSITY OF CALIFORNIA SANTA CRUZ, CA, 2011

Co-instructor, Light and Spectra workshop at Girls Go Tech Fair
NASA AMES, MOUNTAIN VIEW CA, 2011

Teaching Assistant, "Introductory Astronomy: The Stars"
UNIVERSITY OF CALIFORNIA SANTA CRUZ, CA, 2008

PUBLIC/OPEN SOURCE VISUALIZATION PACKAGES, LEAD DEVELOPER

ytini - *blend of yt and widely used special effects software Houdini for scientific visualization*
www.ytini.com

AstroBlend - *tool for use of scientific data in graphics software package Blender*
www.astroblend.com

AVRiot - *resources and tutorials to create motion/sound sensitive wearables*
www.avriot.com

SELECTED AWARDS AND MEDIA COVERAGE

Chancellor's Achievement Award For Diversity - *University of California, Santa Cruz*
JUNE 2014

ARCS Scholar - *University of California, Santa Cruz*
SEPTEMBER 2013

President's Dissertation Year Fellowship - *University of California, Santa Cruz*
SEPTEMBER 2012

Departmental Mentoring Award - *University of California, Santa Cruz*
SEPTEMBER 2012

Regent's Fellowship - *University of California, Santa Cruz*
SEPTEMBER 2006

Charles Geoffrey Hilton Award for Academic Excellence - *University of California, Los Angeles*
SEPTEMBER 2005

Highest Departmental Honors & Phi Beta Kappa - *University of California, Los Angeles*
SEPTEMBER 2005

Group Awards/Media

- **PI:** Blue Waters allocation, 2020, "*The Black Holes Blue Waters Project*" - 150,000 node-hours (approximately $93,045), with the AVL at NCSA

- "*Birth of Planet Earth*" (documentary), ytini software developer
    - Best Scientific Visualization and Data Analytics Showcase award at IEEE Supercomputing in Denver, CO, 2019
    - Electronic Theater, Official Selection: Photosynthesis in a Chromatophore, Excerpt from "Birth of Planet Earth," SIGGRAPH Asia, Brisbane, Australia, 2019
    - Computer Animation Festival, Official Selection: Formation of the Moon, Excerpt from "Birth of Planet Earth," SIGGRAPH Asia, Brisbane, Australia, 2019
    - Best Soundtrack Award, Immersive Film Festival, Espinho, Portugal, 2019
    - Honorable Mention, "For the value of the work as a whole which involves detailed scientific visualizations associated with an enormous artistic beauty," Immersive Film Festival, Espinho, Portugal, 2019
    - Best Educational Dome Film, DTLA Film Festival, Los Angeles, CA, 2019
    - Official Selection, Immersive Film Festival, Espinho, Portugal, 2019
    - Official Selection, Astra Film Festival, Romania, 2019
    - Director's Award, Fulldome Festival Brno 2019
    - Electronic Theater, Official Selection: Photosynthesis in a Chromatophore, Excerpt from "Birth of Planet Earth," SIGGRAPH 2019
    - Best Astronomical Visualizations, Reflections of the Universe Fulldome Festival, Yaroslavl 2019
    - Official Selection, Macon Film Festival 2019
- "*Bringing Visual Effects Software to Scientists*," NCSA Press Release, April 18, 2017
- "*Visualize astrophysics data with Blender*," opensource.com interview, November 24, 2015
- "*Spotlight 41: Jill P. Naiman*," CodePancake Interview, December 11, 2015

VISUALIZATION PUBLICATIONS

First Author

- **Naiman, J.P.**; Borkiewicz, Kalina; Christensen, A.J.,"*Houdini for Astrophysical Visualization*," Publications of the Astronomical Society of the Pacific, Special Focus Issue: Techniques and Methods for Astrophysical Data Visualization, 129, 058008, 2017
- **Naiman, J.P.**, "*AstroBlend – An astrophysical visualization package for Blender*," Astronomy & Computing, 15, 50, 2016.

Nth Author

- Aleo, P. D.; Lock, S. J.; Cox, D. J.; Levy, S. A.; **Naiman, J. P.**; Christensen, A. J.; Borkiewicz, K.; Patterson, R., "*Clustering-informed cinematic astrophysical data visualization with application to the Moon-forming terrestrial synestia*," 2020, MNRAS, 33, 100424
- Borkiewicz, Kalina; **Naiman, Jill**; Lai, Haoming, "*Cinematic Visualization of Multiresolution Data: Ytini for Adaptive Mesh Refinement in Houdini*," The Astronomical Journal, Volume 158, 1, 10, 18, 2019

INVITED VISUALIZATION TALKS

- "*Visualizing Data*," CARLI Counts Webinar, Champaign, IL, September 21, 2020
- "*How to not lie with data*," CARLI Counts Webinar, Champaign, IL, November 18, 2019
- "*Visualizing Science*," Center for Computational Astrophysics, Simons Foundation, New York, December, 12, 2018
- "*Ytini for Cinematic Visualization in Houdini*," National Center for Supercomputing Applications, Champaign, IL, June, 13, 2018
- "*Visualizing Astronomy: How do we learn stuff from big datasets?*," American Museum of Natural History, New York, May, 1, 2018
- "*Visualization for Astrophysics*," National Center for Supercomputing Applications, Illinois, September 21, 2016
- "*Visualization Techniques in Astronomy*," Pixar University, Pixar Emeryville Campus, August 25, 2016
- "*AstroBlend – An Astrophysics Visualization Library*," Blender Conference, Amsterdam, October, 24, 2015

ASTROPHYSICS PUBLICATIONS

First Author

- **Naiman, J. P.**; Soares-Furtado, M.; Ramirez-Ruiz, E., "*Modeling Gas Evacuation Mechanisms in Present-Day Globular Clusters: Stellar Winds from Evolved Stars and Pulsar Heating*," accepted, arXiv:1310.8301
- **Naiman, J. P.**; Ramirez-Ruiz, E.; Lin, D.N.C, "*Stellar wind retention and expulsion in massive star clusters*," MNRAS, 478, 2794, 2018
- **Naiman, J. P.**; Pillepich, Annalisa; Springel, Volker, Ramirez-Ruiz, E.; Hernquist, Lars; Pakmor, Ruediger; Vogelsberger, Mark; Nelson, Dylan; Marinacci, Federico, Genel, Shy; Torrey, Paul, "*First results from the IllustrisTNG simulations: A tale of two elements -- chemical evolution of magnesium and europium*," MNRAS, 477, 1206, 2018
- **Naiman, J. P.**; E. Ramirez-Ruiz, E.; Debuhr, J.; Ma, C.-P., "*The Role of Nuclear Star Clusters in Enhancing Supermassive Black Hole Feeding Rates During Galaxy Mergers*," ApJ 81, 10, 2015
- **Naiman, J.P.**; Ramirez-Ruiz, E.; Lin, D.N.C., "*External Mass Accumulation onto Core Potentials: Implications for Star Clusters, Galaxies, and Galaxy Clusters*," 2011, ApJ, 735, 25
- **Naiman, J.P.**; Ramirez-Ruiz, Enrico, Lin, Douglas N. C., "*Gas Accretion by Star Clusters and the Formation of Ultraluminous X-ray Sources from Cusps of Compact Remnants*," 2009, ApJL, 705, L153

Nth Author, Selected

- Burkhart, B.; Appel, S.; Bialy, S.; Cho, J.; Christensen, A. J.; Collins, D.; Federrath, C.; Fielding, D.; Finkbeiner, D.; Hill, A. S.; Ibanez-Mejia, J. C.; Krumholz, M. R.; Lazarian, A.; Li, M.; Mocz, P.; Mac Low, M. -M.; **Naiman, J.**; Portillo, S. K. N.; Shane, B.; Slepian, Z. Yuan, Y., "*The Catalogue for Astrophysical Turbulence Simulations (CATS)*," 2020, ApJ, accepted, arXiv:2010.11227

- Gallegos-Garcia, Monica; Burkhart, Blakesley; Rosen, Anna L.; **Naiman, Jill P.**; Ramirez-Ruiz, Enrico, "*Winds in Star Clusters Drive Kolmogorov Turbulence*," 2020, ApJ, 899, 2, L30
- Davide Martizzi, Mark Vogelsberger, Maria Celeste Artale, Markus Haider, Paul Torrey, Federico Marinacci, Dylan Nelson, Annalisa Pillepich, Rainer Weinberger, Lars Hernquist, **Jill Naiman**, Volker Springel, "*Baryons in the CosmicWeb of IllustrisTNG - I: Gas in Knots, Filaments, Sheets and Voids*," 2019, MNRAS, 486, 3, 3766-3787
- Paul Torrey, Mark Vogelsberger, Federico Marinacci, Rüdgier Pakmor, Volker Springel, Dylan Nelson, **Jill Naiman**, Annalisa Pillepich, Shy Genel, Rainer Weinberger, Lars Hernquist, "*The evolution of the mass-metallicity relation in IllustrisTNG*," 2019, MNRAS, 484, 4, 5587-5607
- Paul Torrey, Mark Vogelsberger, Lars Hernquist, Ryan McKinnon, Federico Marinacci, Robert A. Simcoe, Volker Springel, Annalisa Pillepich, **Jill Naiman**, Rüdiger Pakmor, Rainer Weinberger, Dylan Nelson, Shy Genel, "*Similar star formation rate and metallicity evolution timescales drive the fundamental metallicity relation*," 2018, MNRAS, 477, 1, L16-L20
- Barnes, David J.; Vogelsberger, Mark; Kannan, Rahul; Marinacci, Federico; Weinberger, Rainer; Springel, Volker; Torrey, Paul; Pillepich, Annalisa; Nelson, Dylan; Pakmor, Rüdiger; **Naiman, Jill**; Hernquist, Lars; McDonald, Michael, "*A census of cool-core galaxy clusters in IllustrisTNG*," 2018, MNRAS, 481, 1809
- Weinberger, Rainer; Springel, Volker; Pakmor, Rüdiger; Nelson, Dylan; Genel, Shy; Pillepich, Annalisa; Vogelsberger, Mark; Marinacci, Federico; **Naiman, Jill**; Torrey, Paul; Hernquist, Lars, "*Supermassive black holes and their feedback effects in the IllustrisTNG simulation*," 2018, MNRAS, 479, 4056
- Genel, Shy; Nelson, Dylan; Pillepich, Annalisa; Springel, Volker; Pakmor, Rüdiger; Weinberger, Rainer; Hernquist, Lars; **Naiman, Jill**; Vogelsberger, Mark; Marinacci, Federico; Torrey, Paul, "*The Size Evolution of Star-forming and Quenched Galaxies in the IllustrisTNG simulation*," 2018, MNRAS, 474, 3976
- Vogelsberger, Mark; Marinacci, Federico; Torrey, Paul; Genel, Shy; Springel, Volker; Weinberger, Rainer; Pakmor, Rüdiger; Hernquist, Lars; **Naiman, Jill**; Pillepich, Annalisa; Nelson, Dylan, "*The uniformity and time-invariance of the intra-cluster metal distribution in galaxy clusters from the IllustrisTNG simulations*," 2018, MNRAS, 474, 2073
- Pillepich, Annalisa; Nelson, Dylan; Hernquist, Lars; Springel, Volker; Pakmor, Rüdiger; Torrey, Paul; Weinberger, Rainer; Genel, Shy; **Naiman, Jill P.**; Marinacci, Federico; Vogelsberger, Mark, "*First results from the IllustrisTNG simulations: the stellar mass content of groups and clusters of galaxies*," 2018, MNRAS, 475, 648
- Springel, Volker; Pakmor, Rüdiger; Pillepich, Annalisa; Weinberger, Rainer; Nelson, Dylan; Hernquist, Lars; Vogelsberger, Mark; Genel, Shy; Torrey, Paul; Marinacci, Federico; **Naiman, Jill**, "*First results from the IllustrisTNG simulations: matter and galaxy clustering*," 2018, MNRAS, 475, 676
- Marinacci, Federico; Vogelsberger, Mark; Pakmor, Rüdiger; Torrey, Paul; Springel, Volker; Hernquist, Lars; Nelson, Dylan; Weinberger, Rainer; Pillepich, Annalisa; **Naiman, Jill**; Genel, Shy, "*First results from the IllustrisTNG simulations: radio haloes and magnetic fields*," 2018, MNRAS, 480, 5113

- Nelson, Dylan; Pillepich, Annalisa; Springel, Volker; Weinberger, Rainer; Hernquist, Lars; Pakmor, Rüdiger; Genel, Shy; Torrey, Paul; Vogelsberger, Mark; Kauffmann, Guinevere; Marinacci, Federico; **Naiman, Jill**, "*First results from the IllustrisTNG simulations: the galaxy color bimodality*," 2018, MNRAS, 475, 624
- Pillepich, Annalisa; Springel, Volker; Nelson, Dylan; Genel, Shy; **Naiman, Jill**; Pakmor, Rüdiger; Hernquist, Lars; Torrey, Paul; Vogelsberger, Mark; Weinberger, Rainer; Marinacci, Federico, "*Simulating Galaxy Formation with the IllustrisTNG Model*," 2018, MNRAS, 473, 4077
- Weinberger, Rainer; Springel, Volker; Hernquist, Lars; Pillepich, Annalisa; Marinacci, Federico; Pakmor, Rüdiger; Nelson, Dylan; Genel, Shy; Vogelsberger, Mark; **Naiman, Jill**; Torrey, Paul, "*Simulating galaxy formation with black hole driven thermal and kinetic feedback*," 2017, MNRAS, 465, 3291
- Montes, Gabriela; Ramirez-Ruiz, Enrico; **Naiman, Jill**; Shen, Sijing; Lee, William H., "*Transport and mixing of r-process elements in neutron star binary merger blast waves*," 2016, ApJ, 830, 12
- De Colle, Fabio; Guillochon, James; **Naiman, Jill**; Ramirez-Ruiz, Enrico, "*The dynamics, appearance and demographics of relativistic jets triggered by tidal disruption of stars in quiescent supermassive black holes*," 2012, ApJ, 760, 103
- Ghez, A. M.; Salim, S.; Weinberg, N. N.; Lu, J. R.; Do, T.; Dunn, J. K.; Matthews, K.; Morris, M. R.; Yelda, S.; Becklin, E. E.; Kremenek, T.; Milosavljevic, M.; **Naiman, J.**, "*Measuring Distance and Properties of the Milky Way's Central Supermassive Black Hole with Stellar Orbits*," 2008, ApJ, 689, 1044

INVITED ASTROPHYSICS TALKS

- "*Modeling the Universe: Cosmological Simulations of Elemental Production*," Center for Astrophysics Summer Colloquium, Cambridge, MA, July, 19, 2018
- "*Chemical Evolution in Simulations of Galaxy Formation: Elemental Evolution in IllustrisTNG*," APS Meeting, Columbus, OH, April 14, 2018
- "*Elemental Evolution in Cosmological Simulations*," UIUC Colloquium, Champaign, IL, September 13, 2017
- "*R-process elements in the IllustrisTNG Simulations*," Nebular Emission Modeling Workshop, Cairns, AU, May 21, 2017
- "*The IllustrisTNG Simulations: Elemental Evolution in Cosmological Simulations*," University of Wisconsin Madison Colloquium, May 4, 2017
- "*Should I Stay or Should I Go: Effects of Stellar Winds on Gas Retention and Expulsion in Star Clusters*," MODEST Meeting, NYC, Sept 10, 2016
- "*Recent Star Formation in Dwarf Galaxies?*" Amherst/UMass Physics and Astronomy Colloquium, Feb 19, 2015
- "*Stellar Wind Mixing: Physical Properties and Visualization*," NSF Symposium, Seattle, WA, Jan 3, 2015
- "*Recent Star Formation in Dwarf Galaxies?*" Amherst/UMass Physics and Astronomy Colloquium, Feb 19, 2015

- "*AstroBlend: A Python Visualization Library for Blender*," Theoretical Cosmology seminar, Harvard CfA, Cambridge, MA, Feb 1, 2015
- "*Stellar Wind Mixing: Physical Properties and Visualization*," NSF Symposium, Seattle, WA, Jan 3, 2015
- "*Nuclear Star Clusters and Supermassive Blackholes*," Theoretical Cosmology seminar, Harvard CfA, Cambridge, MA, Sept 30, 2014
- "*Gas Accumulation and Retention in Dwarf Galaxies: Implications for Recent Star Formation*," Theoretical Cosmology seminar, Harvard CfA, Cambridge, MA, Dec 15, 2013
- "*Recent Star Formation in Dwarf Galaxies?*" DARK Institute. Copenhagen, Denmark. June 20, 2013
- "*Globular Cluster Gas Heating by Millisecond Pulsars,*" Physical Applications of Millisecond Pulsars. Aspen Center for Physics. Aspen, CO. Jan 20, 2013
- "*Star Formation Histories of Dwarf Galaxies*," GalForm Talk. Berkeley, CA. Nov 8, 2012
- "*Gas Accumulation & Retention in Dense Stellar Systems and Dwarf Galaxies*," A Window to the Formation of the Milky Way. Aspen Center for Physics. Aspen, CO. May 20, 2012
- "*A Few Crazy Ways of Getting Gas into Dwarf Galaxies*," Theoretical Cosmology seminar, Harvard CfA, Cambridge, MA, April 5, 2012
- "*The Properties of Gas in and around Dwarf Galaxies and its Role in Regulating Star Formation*," Mass Loss Return from Stars to Galaxies. STSI, Baltimore, MD, March 30, 2012
- "*Gas Structures in Star Clusters: The Curious Case of Multiple Stellar Populations in Globular Clusters*," Interstellar and Galactic Medium Program of Studies seminar, UCSC, March 7, 2012
- "*A Model of Ultra Luminous X-ray Sources in Young Stellar Clusters*," DARK Summer Workshop, Systems. DARK Institute, Copenhagen, Denmark. June 29, 2010
- "*Gas in Stellar Systems*," Northwestern theory seminar, Chicago, IL, June 7, 2010