Earl Bellinger

Ph.D. Candidate – Stellar Astrophysics

Max Planck Institute & Yale University

Department of Astronomy, Yale University
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New Haven, CT
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Education

Ph.D. Astrophysics
2015-present
International Max Planck Research School
- *Max Planck Institute for Solar System Research, Göttingen, Germany*
- *Department of Astronomy, Yale University, New Haven, CT, USA*
- *Institute of Computer Science, University of Göttingen, Germany*

Fellow of the National Physical Science Consortium
Thesis Topic: Asteroseismic Inversions of Solar-like Oscillators

M.Sc. Computer Science
2012-2014
Indiana University, Bloomington, IN, USA
Fellow of the National Physical Science Consortium
GPA: 3.94/4.0

B.Sc. Computer Science
B.Sc. Applied Mathematics
2008-2012
State University of New York at Oswego, USA
Honors Thesis: Multiphase Relations of Magellanic Cloud Cepheids
GPA: 3.81/4.0 (*summa cum laude*, ranked #1 in computer science)

Research

Universities

Yale Asteroseismic inversions of solar-like stars
2016–present *Yale Department of Astronomy, New Haven, CT, USA*

Indiana Protein inference and quantification from tandem mass spectrometry
2013–2015 *Proteomics Laboratory, Bloomington, IN, USA*

UFAL Dynamics of interacting electrons in disordered systems
2011 *Federal University of Alagoas, Maceió, Brazil*

UFSC Multiphase relations of Magellanic Cloud Cepheids
2011 *Federal University of Santa Catarina, Florianópolis, Brazil*

Laboratories

Max Planck Institute Fundamental stellar parameters in an instant with machine learning
2015–present *Stellar Ages & Galactic Evolution Group, Göttingen, Germany*

NIST HydratiCA Information Discoverer, a data mining tool for 3D chemical simulations
2013–2014, 2017 *National Institute of Standards and Technology, Gaithersburg, MD, USA*

NII Asynchronous updating in elementary cellular automata with stochastic perturbations
2013 *National Institute of Informatics, Tokyo, Japan*

NASA CASSIUS, a communication tool for the Cassini mission to Saturn
2012 *Jet Propulsion Laboratory, Pasadena, CA, USA*

LNAS Chimera: an automated observatory system
2010 *National Laboratory of Astrophysics, Itajubá, Brazil*

Teaching

ASTR 550 Teaching Assistant, Stellar Astrophysics
Spring 2017 *Department of Astronomy, Yale University*

M.Phy.55x.3C Assistant, Numerical Experiments in Stellar Physics
Summer 2016 *Fakultät Physik, Georg-August-Universität Göttingen*

CSCI-C211/A591 Associate Instructor, Introduction to Computer Science (Honors section)
Fall 2012 *School of Informatics and Computing, Indiana University*

HON 150 Seminar Leader, Introduction to Honors
Fall 2010 *Honors Program, SUNY Oswego*

Publications

Refereed Articles

[5] **Bellinger, E. P.**, Angelou, G., Hekker, S., Basu, S., Ball, W., Guggenberger, E. (2016). Fundamental Parameters of Main-Sequence Stars in an Instant with Machine Learning. *The Astrophysical Journal*, accepted.

[4] Guggenberger, E., Hekker, S., Basu, S., **Bellinger, E. P.** (2016). Significantly improving stellar mass and radius estimates: A new reference function for the $\Delta\nu$ scaling relation. *Monthly Notices of the Royal Astronomical Society*, 461 (2), doi: 10.1093/mnras/stw1326.

[3] Glover, M., **Bellinger, E. P.**, Radivojac, P., Clemmer, D. (2015). Penultimate Proline in Neuropeptides. *Analytic Chemistry*, 87 (16), 8466–8472, doi: 10.1021/acs.analchem.5b01889.

[2] Ji, C., Li, Y. F., **Bellinger, E. P.**, Li, S., Arnold, R. J., Radivojac, P., Tang, H. (2015, September). A maximum-likelihood approach to absolute protein quantification in mass spectrometry. In *Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology and Health Informatics* (pp. 296-305).

[1] Ngeow, C. C., Kanbur, S. M., **Bellinger, E. P.**, Marconi, M., Musella, I., Cignoni, M., & Lin, Y. H. (2012). Period-luminosity relations for Cepheid variables: from mid-infrared to multi-phase. *Astrophysics and Space Science*, 341(1), 105-113, doi: 10.1007/s10509-012-1018-5.

Conference Proceedings

[7] **Bellinger, E. P.**, Angelou, G., Hekker, S., Basu, S., Ball, W., Guggenberger, E. (2016). Fundamental Parameters in an Instant with Machine Learning: Application to Kepler LEGACY Targets. *Seismology of the Sun and Distant Stars 2016*, submitted.

[6] Hekker, S., Elsworth, Y., Basu, S., **Bellinger, E. P.** (2016). Evolutionary states of red-giant stars from grid-based modelling. *Seismology of the Sun and Distant Stars 2016*, submitted.

[5] **Bellinger, E. P.**, Wysocki, D., Kanbur, S. M. (2015). Measuring amplitudes of harmonics and combination frequencies in variable stars. *Communications from the Konkoly Observatory of the Hungarian Academy of Sciences*, 105.

[4] **Bellinger, E. P.**, Kanbur, S. M., & Ngeow, C. C. (2012). New insights into the Cepheid PL Relation through the use of multiphase relations. *Proceedings of the 20th Stellar Pulsations Conference.*

[3] Reyner, S., **Bellinger, E. P.**, & Kanbur, S. M. (2012). The approximation of RR Lyrae and eclipsing binary light curves using cubic polynomials. *Proceedings of the 20th Stellar Pulsations Conference.*

[2] **Bellinger, E. P.** (2012). Multiphase Relations of Magellanic Cloud Cepheids. *Proceedings of the 2012 National Conference on Undergraduate Research.*

[1] **Bellinger, E. P.**, Kanbur, S. M., & Ngeow, C. C. (2011). Multiphase Comparison of Period-Luminosity Relations for Magellanic Cloud Cepheids. *Proceedings of the 9th Pacific Rim Conference on Stellar Astrophysics* (Vol. 451, p. 311).

Technical Reports

[1] **Bellinger, E. P.**, Conner, D., Mittman, D., Magee, K., & Heventhal, B. (2012). CASSIUS: the Cassini Uplink Scheduler. *Jet Propulsion Laboratory: National Aeronautics and Space Administration*, hdl:2014/43122.

Talks

Conferences

October 2015 **RR Lyrae 2015**
Resolving combination frequency amplitudes of multi-mode pulsators
Visegrád, Hungary

January 2015 **American Astronomical Society**
Optimal Model Discovery of Periodic Variable Stars
Seattle, WA, USA

March 2012 **National Conference on Undergraduate Research**
Multiphase Relations of Cepheid Variable Stars in the Magellanic Clouds
Weber State University, Ogden, UT, USA

Workshops

May 2016 **6th Aarhus Workshop on Red Giant Branch Modelling**
Stellar Parameters in an Instant with Machine Learning
Max-Planck-Institut für Sonnensystemforschung, Göttingen, Germany

January 2015 **Delhi Workshop on Variable Stars**
Calibrating the Cepheid Distance Scale
Delhi, India

January 2014 **Kerala Workshop on Stellar Astrophysics**
Automated Supervised Classification of Variable Stars
Kerala, India

April 2013 **KUBIC-NII Joint Seminar on Bioinformatics**
Asynchronous Updating in 1D Cellular Automata with Stochastic Perturbations
Kyoto, Japan

Public Lectures

October 2016 **Science Today** (invited talk)
From Starlight to Stellar Ages: A Look Inside the Private Lives of Stars
Oswego, NY, USA

April 2012 **Quest Global Laboratory**
Dynamics of Interacting Electrons in Disordered Systems
Oswego, NY, USA

April 2012 **Quest Global Laboratory**
Synapsolution: Producing Prodigies of Problem Solving
Oswego, NY, USA

Conference Posters

July 2016 **Joint TASC2 & KASC9 Workshop – SPACEINN & HELAS8 Conference**
Fundamental Parameters of Main-Sequence Stars in an Instant with Machine Learning
Angra do Heroísmo, Terceira-Açores, Portugal

June 2015 **The KASC8/TASC1 Workshop**
GarsGen: An in-situ *optimization algorithm for GARSTEC and ADIPLS stellar physics codes*
Aarhus, Denmark

September 2011 **20th Stellar Pulsation Conference**
New insights into the Cepheid PL Relation through the use of multiphase relations
Granada, Spain

April 2011 **Sigma Xi Northeastern Research Symposium**
Multiphase Comparison of PL and PW Relations for Magellanic Cloud Cepheids
Stony Brook, NY, USA

January 2011 **American Astronomical Society**
Multiphase Comparison of PL/PC Relations
Seattle, WA, USA

Misc

Languages

Natural English, German, Portuguese, Spanish

Machine

Expertise R, Python, Bash, LaTeX, HTML, CLISP, Scheme, Java, MATLAB

Proficiency C, Javascript, Perl, SQL, FORTRAN 77/95, CSS

Familiarity ActionScript, Assembly, BASIC, C++, Haskell, Mathematica, ML, PHP, Prolog, Ruby, VB

PhD Schools

MESA Summer School on Stellar Evolution
2016 *U.C. Santa Barbara, CA, USA*

Azores International Advanced School in Space Sciences
2016 *Horta, Faial, Azores Islands, Portugal*

Music

MegaGauß Band leader and eletric bass player of 12-member ensemble
2015–2016

Well-Read Citizens Composer, co-producer, instrumentalist, and vocalist on 10-track LP
2012 "Is This The Morning When We Wake Up?" (*Tyler Hall Records*)

The Occupants Electric bass on 2-track EP
2012 "The Occupied EP" (*Tyler Hall Records*)

Volunteering

St. Baldrick's Foundation Helped raise over $50,000 for research to find cures for childhood cancers.
Oswego, NY, USA
2010-2011

Easy Street Horse & Barnyard Rescue Provided care for horses with this IRS approved 501(c)(3) family-run charitable organization.
Amsterdam, NY, USA
2006-2010

AWARDS & HONORS

NPSC Fellowship National Physical Science Consortium Graduate Fellowship
2012–2017

Outstanding Senior Oebele Van Dyk Outstanding Computer Science Senior Award
2012

Chancellor's Award SUNY Chancellor's Award for Student Excellence
2012

SFCC Grant SUNY Oswego Student/Faculty Collaborative Challenge Grant
2012

RBE Scholarship Robert Brian Ellis Scholarship
2011

NYSFHB Scholarship New York State Federation of Home Bureau Scholarship
2011

NSF REU National Science Foundation International Research Experience for Undergraduates / SUNY Oswego Global Laboratory Scholarship *(awarded twice)*
2010–2011

SMART Grant National Science and Mathematics Access to Retain Talent (SMART) Grant *(awarded twice)*
2010–2011

AC Grant National Academic Competitiveness Grant *(awarded twice)*
2008

Presidential Scholarship SUNY Oswego Presidential Scholarship *(awarded four times)*
2008-2012