Earl Patrick **Bellinger**

PH.D. CANDIDATE · STELLAR ASTROPHYSICS · ARTIFICIAL INTELLIGENCE

Max Planck Institute for Solar System Research — Yale University — University of Göttingen

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EDUCATION

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

Fellow of the National Physical Science Consortium
Thesis: Forward and Inverse Problems in Asteroseismology

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

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

Advanced 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*

RESEARCH POSITIONS

Universities

Yale Department of Astronomy, Yale University, New Haven, CT
2016–2017 *Visiting Assistant in Research (stellar astrophysics)*

IU School of Informatics & Computing, Indiana University, Bloomington, IN
2013–2015 *Research Assistant (machine learning)*

UFAL Physics Institute, Federal University of Alagoas, Maceió, Brazil
2011 *NSF Research Student (quantum mechanics)*

UFSC Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil
2010 *NSF Research Student (variable stars)*

National Laboratories

MPS Max Planck Institute for Solar System Research, Göttingen, Germany
2015–present *Research Assistant & Ph.D. Candidate (asteroseismology)*

NIST National Institute of Standards and Technology, Gaithersburg, MD, USA
2013, 2014 *Guest Researcher (data mining)*

NII National Institute of Informatics, Tokyo, Japan
2013 *Research Student (artificial intelligence)*

NASA Jet Propulsion Laboratory, Pasadena, CA, USA
2012 *Summer Undergraduate Research Fellow (Cassini mission to Saturn)*

Teaching

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

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

IU Associate Instructor, CSCI-C211, Introduction to Computer Science
Fall 2012 *School of Informatics and Computing, Indiana University*

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

Selected Talks

September 2017 **Rocks & Stars II**, Max Planck Institute for Solar System Research
"The Seismic Structures of Solar-Type Stars"

June 2017 **ERES-III**, Yale University, New Haven, CT, USA
"Fundamental Parameters of Exoplanet Host Stars with Asteroseismology"

May 2016 **6th Aarhus Workshop on Red Giant Branch Modelling**, Germany
"Stellar Parameters in an Instant with Machine Learning"

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

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

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

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

Publications

Summary

- 16 papers (9 first author/co-first author, 1 submitted)
- 7 journal articles (3 first/co-first author)
- 8 conference proceedings (5 first author)
- 1 NASA technical report (1 first author)

Complete listing (reverse chronological)

[*] **Bellinger, E. P.**, Basu, S., Hekker, S., Ball, W. (2017). Model-independent measurement of internal stellar structure in 16 Cygni A and B. *Submitted to the Astrophysical Journal*.

[15] **Bellinger, E. P.**, Angelou, G., Hekker, S., Basu, S., Ball, W., & Guggenberger, E. (2017). Fundamental Parameters in an Instant with Machine Learning: Application to Kepler LEGACY Targets. In proceedings of *Seismology of the Sun and Distant Stars 2016*.

[14] Hekker, S., Elsworth, Y., Basu, S., & **Bellinger, E. P.** (2017). Evolutionary states of red-giant stars from grid-based modelling. In proceedings of *Seismology of the Sun and Distant Stars 2016*.

[13] Guggenberger, E., Hekker, S., Basu, S., Angelou, G. C., & **Bellinger, E. P.** (2017). Mitigating the mass dependence in the $\Delta\nu$ scaling relation of red-giant stars. *Monthly Notices of the Royal Astronomical Society*, 470 (2).

[12] Angelou, G. C., **Bellinger, E. P.**, Hekker, S., & Basu, S. (2017). On the Statistical Properties of the Lower Main Sequence. *The Astrophysical Journal*, 839 (2) 116. (co-first author)

[11] **Bellinger, E. P.**, Angelou, G. C., Hekker, S., Basu, S., Ball, W., & Guggenberger, E. (2016). Fundamental Parameters of Main-Sequence Stars in an Instant with Machine Learning. *The Astrophysical Journal*, 830 (1), 20.

[10] 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).

[9] **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.

[8] Glover, M., **Bellinger, E. P.**, Radivojac, P., & Clemmer, D. (2015). Penultimate Proline in Neuropeptides. *Analytical Chemistry*, 87 (16), 8466-8472.

[7] Ji, C., Li, Y., **Bellinger, E. P.**, Li, S., Arnold, R., Radivojac, P., & Tang, H. (2015). 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).

[6] **Bellinger, E. P.**, Conner, D., Mittman, D., Magee, K., & Heventhal, B. (2012). CASSIUS: the Cassini Uplink Scheduler. *JPL: NASA*, hdl:2014/43122.

[5] 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.

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

[2] **Bellinger, E. P.** (2012). Multiphase Relations of Magellanic Cloud Cepheids. In 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. In proceedings of the *9th Pacific Rim Conference on Stellar Astrophysics*, 451 (311).

Awards & Honors

2012–2017 National Physical Science Consortium (NPSC) Graduate Fellowship

2012 Oebele Van Dyk Outstanding Computer Science Senior Award

2012 SUNY Chancellor's Award for Student Excellence

2012 SUNY Oswego Student/Faculty Collaborative Challenge Grant

2011 Robert Brian Ellis Scholarship

2011 New York State Federation of Home Bureau Scholarship

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

2010–2011 U.S. National SMART Grant *(awarded twice)*

2008 National Academic Competitiveness Grant *(awarded twice)*

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