Christopher Shallue

PhD Candidate in Astronomy and Astrophysics
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EDUCATION

Harvard University — **Cambridge, MA, USA**
PhD in Astronomy and Astrophysics — September 2019 – present
Expected completion: May 2024

Monash University — **Clayton, VIC, Australia**
B.S. in Mathematics (Honors) *GPA:* 4.00. — March 2009 – June 2012

EMPLOYMENT

Google — **Mountain View, CA, USA**
Senior Software Engineer — January 2014 – September 2019

Monash University — **Clayton, VIC, Australia**
Teaching Associate in Mathematics — July 2011 – July 2013

AWARDS

- 2012 Monash University Medal for Undergraduate Excellence (*top science student*)
- 2012 Carl Moppert Prize for Mathematics (*top mathematics honors student*)
- 2012 Australian Postgraduate Award (*research scholarship*)
- 2011 Monash University Jubilee Honors Scholarship
- 2010 Highest Academic Performance in a Science Course at Monash University (*6 time recipient*)
- 2010 Monash University Dean's List Fellowship Award
- 2009 Monash University Scholarship for Excellence
- 2008 Australian Student Prize (*awarded to top 500 students nationwide*)
- 2008 Premier's VCE Award (*awarded to top students statewide*)

PUBLICATIONS

Citations: 948 (765 peer-reviewed; 532 as first author)

Refereed / under review

- **Shallue, C.** and Eisenstein, D. "Reconstructing the Early Universe with Convolutional Neural Networks." *In preparation* (2022).
- de Beurs, Z., Vanderburg, A., **Shallue, C.**, et al. "Identifying Exoplanets with Deep Learning. IV. Removing Stellar Activity Signals from Radial Velocity Measurements Using Neural Networks." *Under review* (2022).
- Yu, L., Vanderburg, A., Huang, C., **Shallue, C.**, et al. "Identifying Exoplanets with Deep Learning III: Automated Triage and Vetting of TESS Candidates." *The Astronomical Journal*, 158, 1 (2019).
- Dattilo, A., Vanderburg, A., **Shallue, C.**, et al. "Identifying Exoplanets with Deep Learning II: Two New Super-Earths Uncovered by a Neural Network in K2 Data." *The Astronomical Journal*, 157, 5 (2019).
- **Shallue, C.** et al. "Measuring the Effects of Data Parallelism on Neural Network Training." *Journal of Machine Learning Research*, 20, 112 (2019).

- Zhang, G. including **Shallue, C.** "Which Algorithmic Choices Matter at Which Batch Sizes? Insights From a Noisy Quadratic Model." *Neural Information Processing Systems*, 8194 (2019).
- **Shallue, C.** and Vanderburg, A. "Identifying Exoplanets with Deep Learning: A Five Planet Resonant Chain around Kepler-80 and an Eighth Planet around Kepler-90." *The Astronomical Journal*, 155, 94 (2018).
- Dhingra, B., **Shallue, C.**, et al. "Embedding Text in Hyperbolic Spaces." *Twelfth Workshop on Graph-Based Methods for Natural Language Processing*, 59 (2018).
- **Shallue, C.** and Wanless, I. "Permutation Polynomials and Orthomorphism Polynomials of Degree Six." *Finite Fields and Their Applications*, 20, 84 (2013).

Preprints

- Nado, Z., Gilmer, J., **Shallue, C.**, et al. "A Large Batch Optimizer Reality Check: Traditional, Generic Optimizers Suffice Across Batch Sizes." `https://arxiv.org/abs/2102.06356` (2021).
- Choi, D., **Shallue, C.**, et al. "On Empirical Comparisons of Optimizers for Deep Learning." `https://arxiv.org/abs/1910.05446` (2020).
- Choi, D., Passos, A., **Shallue, C.**, et al. "Faster Neural Network Training with Data Echoing." `https://arxiv.org/abs/1907.05550` (2019).
- **Shallue, C.** "Permutation Polynomials of Finite Fields." *Honors Thesis.* `https://arxiv.org/abs/1211.6044` (2012).

SCIENCE OUTREACH

Events

- Presented a public lecture at the SETI institute. "Big Astronomy Begins: Searching for Exoplanets with AI" (2018). `https://youtu.be/V_rcLEBW1ro`.
- Presented at Science Week at Brighton High School (2018).
- Presented at the NASA Frontier Development Lab (2017, 2018).
- Led a workshop at Women Techmakers (2017).
- Hosted an "AMA" (Ask Me Anything) in the NASA Science Series (2017).

TV / Podcasts / Radio

- "Hunting for Planets with Machine Learning." Televised interview for Cosmic Front on NHK (Japan). Aired Sep. 13, 2018.
- "Detecting Planets with Deep Learning." Practical AI podcast. Aired Jul. 16, 2018.
- "Discovering Exoplanets with Deep Learning." This Week in Machine Learning & AI. Aired Mar. 8, 2018.
- "Discovering Planets with Machine Learning." ABC Australia Radio interview. Aired Dec. 15, 2017.

Press Releases

- "Artificial Intelligence, NASA Data Used to Discover Eighth Planet Circling Distant Star." Joint release by NASA, Google, and the University of Texas. Presented in a live teleconference to 44 journalists and 300,000 listeners. Dec. 14, 2017. `https://go.nasa.gov/39JuyiI`.

Press Coverage

- "Google AI Helped Find the First Solar System Outside Our Own with 8 Planets." Dec. 14, 2017.
  Featured in outlets including the New York Times, Washington Post, CNN, National Geographic, BBC, Wired, Popular Science, and UT Austin's "Research that Changed the World in 2017." Follow up interviews and coverage in Korea (Jan., 2018), Taiwan (Feb., 2018), Japan (Aug., 2018), and China (Sep., 2018).
- "Google Open Sources Image Captioning Model in TensorFlow." Sep. 22, 2016.
  Featured in outlets including TechCrunch, Engadget, Venture Beat, and Gizmodo.

TEACHING AND ADVISING

Teaching

- Teaching Fellow for *Stellar and Planetary Astronomy*, Harvard University (2022).
- Six-time instructor for a two-day *Machine Learning Crash Course* at Google (2016–2019).
- Tutor at the Mathematics Learning Center, Monash University (2013).
- Teaching Associate for *Mathematics For Computer Science*, Monash University (2013).
- Teaching Associate for *Algebra and Number Theory*, Monash University (2012).
- Teaching Associate for *Techniques For Modeling*, Monash University (2011).
- Tutor for 10+ high school and university students (2009–2012).

Advising / Mentoring

- Primary advisor to 3 researchers in the Google AI residency program (2017–2019). Role included: research guidance; pair programming and writing; code review.
- Mentor to 2 astronomy undergraduate students, Anne and Zoe (2018–2020). My project with Anne was featured on NPR radio and in a short film (`https://youtu.be/ZMz7UVC7xBs`).
- Mentor to 10+ junior engineers and researchers at Google (2015–2019). Role included: orientation advice; research and career guidance; improving coding skills.
- Manager and primary advisor of Alex Tamkin, a Google research intern (2018).

Last updated May 13, 2022