

# Ben K. D. Pearce

benkdpearce.com

## Research Interests

-Origins of life  
-Prebiotic chemistry  
-The RNA world  
-Meteoritic organics

## Contact Information

McMaster University  
ABB-253, 1280 Main St. W  
Hamilton, ON, Canada L8S 4M1  
+1 (778) 870-0980  
[pearcbe@mcmaster](mailto:pearcbe@mcmaster)

## Education

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### **Ph.D. in Physics and Astronomy – Astrobiology**

Expected Completion: August 2021  
McMaster University, Hamilton, ON, Canada

Sept 2017 – present

### **M.Sc. in Physics and Astronomy – Astrobiology (GPA: 11.3/12)**

McMaster University, Hamilton, ON, Canada

Sept 2015 – Jul 2017

### **B.Sc. in Astronomy (with Distinction – Avg: 87%)**

University of British Columbia, Vancouver, BC, Canada

Sept 2012 – Apr 2015

### **B.Sc. in Software Engineering (GPA: 2.8/4)**

Schulich School of Engineering, University of Calgary, Calgary, AB, Canada

Sept 2005 – Apr 2010

## Publications

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**Pearce, B. K. D.**, Tupper, A. S., Pudritz, R. E., & Higgs, P. G. 2017. Constraining the Time Interval for the Origin of Life on Earth. *Accepted to Astrobiology Oct. 3rd, 2017*

**Pearce, B. K. D.**, Pudritz, R. E., Semenov, D. A., & Henning, Th. 2017. Origin of the RNA World: The Fate of Nucleobases in Warm Little Ponds. *Proceedings of the National Academy of Sciences USA*, **114**, 11327–11332

**Pearce, B. K. D.**, & Pudritz, R. E. 2016. Meteorites and the RNA World: A Thermodynamic Model of Nucleobase Synthesis within Planetesimals. *Astrobiology*, **16**, 853–872

Cobb, A. K., Pudritz, R. E., & **Pearce, B. K. D.** 2015. Nature's Starships II: Simulating the Synthesis of Amino Acids in Meteorite Parent Bodies. *The Astrophysical Journal*, **809**, 6

**Pearce, B. K. D.**, & Pudritz, R. E. 2015. Seeding the Pregenetic Earth: Meteoritic Abundances of Nucleobases and Potential Reaction Pathways. *The Astrophysical Journal*, **807**, 85

## Employment

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### **Graduate Researcher**

Supervisor: Dr. Ralph Pudritz  
Origins Institute, McMaster University, Hamilton, ON, Canada

Sept 2015 – Present

- Theoretical research on the origin of the RNA world via meteorite-delivered organics to warm little ponds.

**Presenter** Sept 2015 – Present  
William J. McCallion Planetarium and Origins Institute 3D Theatre  
McMaster University, Hamilton, ON, Canada

- Development and presentation of a variety of public and private astronomy- and physics-based shows using planetarium and 3D theatre software.

**Visiting Graduate Researcher** May 2016 – July 2016  
Supervisors: Dr. Thomas Henning, Dr. Oliver Trapp  
Max Planck Institute of Astronomy and Heidelberg University, Heidelberg, Germany

- Theoretical research on the fate of nucleobases in warm little ponds and theoretical and experimental research on the formation of nucleotides in such environments.

**Summer Research Student** May 2015 – Sept 2015  
Supervisor: Dr. Aaron Boley  
University of British Columbia, Vancouver, BC, Canada

- Hydrodynamics simulations of chondrule formation via planetesimal collision shockwaves.

**Summer Research Student** May 2014 – Aug 2014  
Supervisor: Dr. Ralph Pudritz  
Origins Institute, McMaster University, Hamilton, ON, Canada

- Thermodynamic simulations of amino acid formation in planetesimals.

## **Presentations**

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**Steps to the RNA World: Nucleobase Survival and Evolution in Warm Little Ponds**  
Pearce, B. K. D., Pudritz, R. E., Semenov, D. A., and Henning, Th.  
Oral Presentation, Astrobiology Science Conference (AbSciCon 2017) April 2017  
Mesa, AZ, USA

**The Survival and Accumulation of Genetic Precursors Delivered to Warm Little Ponds on Early Terrestrial Planets**  
Pearce, B. K. D., Pudritz, R. E., Semenov, D. A., and Henning, Th.  
Oral Presentation, Physics & Astronomy Graduate Student Symposium Day Oct 2016  
McMaster University, Hamilton, ON, Canada

**Meteorites and the RNA World**  
Pearce, B. K. D., and Pudritz, R. E.  
Oral Presentation, Planet and Star Formation Seminar May 2016  
Max Planck Institute of Astronomy, Heidelberg, Germany

**How Nucleobases Formed in Asteroids and Comets: Simulating 15 Candidate Reaction Pathways**  
Pearce, B. K. D., and Pudritz, R. E.  
Oral Presentation, Astrobiology Science Conference (AbSciCon 2015) June 2015  
Chicago, IL, USA

**Nature's Starships: Simulating the Synthesis of Amino Acids in Meteorite Parent Bodies**  
Pearce, B. K. D., Cobb, A. K., and Pudritz, R. E.  
Oral Presentation, Canadian Undergraduate Physics Conference (CUPC 2014) Oct 2014  
Queen's University, Kingston, ON, Canada

## Teaching Experience

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**Teaching Assistant** Sept 2016 – April 2017  
BIOPHYS 3D03: Origins of Life, ASTR 2E03: Planetary Astronomy, ASTR 2B03: Big Questions  
McMaster University, Hamilton, ON, Canada

**Tutor** Sept 2016 – Dec 2016  
Physics Drop-in Centre  
McMaster University, Hamilton, ON, Canada

**Teaching Assistant** Sept 2015 – April 2016  
PHYS 1E03: Waves, Electricity and Magnetic Fields, ASTR 2B03: Big Questions, PHYS 1A03:  
Introductory Physics  
McMaster University, Hamilton, ON, Canada

**Mentor** October 2014 – Present  
McMaster University, Hamilton, ON, Canada  
University of British Columbia, Vancouver, BC, Canada

- Providing educational and career guidance to a variety of undergraduate and entering graduate students.

**Teaching Assistant** Jan 2014 – Dec 2014  
MATH 110: Differential Calculus, MATH 101: Integral Calculus with Applications to Physical  
Sciences  
University of British Columbia, Vancouver, BC, Canada

## Academic Awards and Honours

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- NSERC Postgraduate Scholarship-Doctoral (PGS-D), September 2017. **\$63,000.**
- Best Talk at McMaster Physics & Astronomy Graduate Student Symposium Day, Oct 2016. **\$20.**
- Joseph and Joanne Lee Ontario Graduate Scholarship (OGS), September 2016. **\$15,000.**
- NSERC Canada Graduate Scholarship-Michael Smith Foreign Study Supplement (CGS-MSFSS), May 2016. **\$5,300.**
- NSERC Alexander Graham Bell Canada Graduate Scholarship-Master's (CGS-M), September 2015. **\$17,500.**
- NSERC Undergraduate Student Research Award (USRA), May 2015. **\$8,800.**
- Paul Sykes Scholarship in Astronomy, September 2014. **\$100.**
- NSERC CREATE undergraduate student research fellowship in the Canadian Astrobiology Training Program (CATP), May 2014. **\$1,000.**
- NSERC Undergraduate Student Research Award (USRA), May 2014. **\$8,400.**
- Dean's Honour List, Sept 2012 – May 2014.

## Service

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**Committee Member** June 2017 – Present  
Selection Committee for an Associate Dean of Graduate Studies (Science)  
McMaster University, Hamilton, ON

- Participate in the interviewing of candidates and the selection of an Associate Dean of Graduate Studies for the Faculty of Science.

**Committee Member**

July 2015 – Present

Space Exploration Topical Team in Astrobiology  
Canadian Space Agency (CSA)

- Making recommendations for the astrobiology-focussed questions, tasks, and celestial targets around which CSA's future space exploration missions should be centered.

**President**

March 2014 – March 2015

Astronomy Club  
University of British Columbia, Vancouver, BC, Canada

- Overseeing of UBC Astronomy Club operations, organization of outreach events, delegation of tasks to the 4 Vice Presidents and 16 supporting positions, running of weekly meetings, and presentation of talks at club and student outreach events.

**Summer Radio Telescope Volunteer**

May 2013 – July 2013

Physics and Astronomy Department  
University of British Columbia, Vancouver, BC, Canada

- Design and performance of tests to characterize the 2.1m-diameter radio telescope tracking issues.

**Lead Audio/Visual Volunteer**

May 2013

2013 Canadian Astronomical Society (CASCA) Annual (3-day) Meeting  
University of British Columbia, Vancouver, BC, Canada

- Scheduling and training of audio/visual volunteers, and monitoring and controlling of auditorium lights, sound, projectors and microphones before, during and after presentations.

**Professional Development**

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**Summer Astronomical Instrumentation School**

Aug 2013

Dunlap Institute of Astronomy and Astrophysics, Toronto, ON, Canada