Ryan E. Cloutier

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Education

PhD in Astronomy & Astrophysics
University of Toronto *2014–2019*
Supervisors: Kristen Menou (*UofT*) & René Doyon (*UdeM*)
Expected completion date: Summer 2019

Honours Bachelor of Science with Distinction
Physics & Astronomy, University of Toronto *2009–2014*
Supervisor: Ray Jayawardhana

Doctoral Thesis

Title (tentative): *Applications of Gaussian process regression to the detection and characterization of distant worlds around small stars*

Supervisors: Kristen Menou (*UofT*) & René Doyon (*UdeM*)

Undergraduate Thesis

Title: *A deep Spitzer survey of circumstellar disks in the young Double Cluster, h and χ Persei*

Supervisor: Ray Jayawardhana

Research Experience

Graduate

PhD Candidate
Department of Astronomy & Astrophysics (UofT), Centre for Planetary Sciences, and the Institute for Research on Exoplanets *2015–present*

Graduate Research Courses
Department of Astronomy & Astrophysics (UofT) and Centre for Planetary Sciences *2014–2015*

Undergraduate

Undergraduate Researcher Positions
Canadian Institute for Theoretical Astrophysics, Dunlap Institute for Astronomy & Astrophysics, and the Department of Astronomy & Astrophysics *2012–2014*

First Author Refereed Publications

Cloutier, R., Astudillo-Defru, N., Doyon, R., et al. *Confirmation of the radial velocity super-Earth K2-18c with HARPS and CARMENES*, 2018, A&A 621A, 49

Cloutier, R., Doyon, R., Bouchy, F., Hébrard, G. *Quantifying the observational effort required for the radial velocity characterization of TESS planets*, 2018, AJ, 156, 82

Cloutier, R., Artigau, É., Delfosse, X., et al. *Predictions of planet detections with near infrared radial velocities in the up-coming SPIRou Legacy Survey-Planet Search*, 2018, AJ, 155, 93

Cloutier, R., Astudillo-Defru, N., Doyon, R., et al. *Characterization of the K2-18 multi-planetary system with HARPS: a habitable zone super-Earth and discovery of a second, warm super-Earth on a non-coplanar orbit*, 2017, A&A, 608A, 35

Cloutier, R., Doyon, R., Menou, K., et al. *On the radial velocity detection of additional planets in transiting, slowly rotating M-dwarf systems: the case of GJ 1132*, 2017, AJ, 153, 9

Cloutier, R. & Triaud A. H. M. J. *Prospects for detecting the Rossiter-McLaughlin effect of Earth-like planets: the test case of TRAPPIST-1b and c*, 2016, MNRAS, 462, 4018

Cloutier, R., Tamayo, D., & Valencia, D. *Could Jupiter or Saturn have ejected a fifth giant planet?* 2015, ApJ, 813, 8

Cloutier, R., Currie, T., Rieke, G., et al. *A deep Spitzer survey of circumstellar disks in the young Double Cluster, h and χ Persei*, 2014, ApJ, 796, 127

Cloutier, R. & Lin, M. K. *Orbital migration of giant planets induced by gravitationally unstable gaps: the effect of planet mass*, 2013, MNRAS, 434, 621

Contributing Author Refereed Publications

Ment, K., et al. (including **Cloutier, R.**) *A second planet with an Earth-like composition orbiting the nearby M dwarf LHS 1140*, 2018, AJ, 157, 32

Bonfils, X., Almenara, J.M., **Cloutier, R.**, et al. *Radial velocity follow-up of GJ 1132 with HARPS: a precise mass for planet 'b' and the discovery of a second planet*, 2018, A&A 618A, 142

Nelson, B., Ford, E., Buchner, J., **Cloutier, R.**, et al. *Quantifying the evidence for a planet in radial velocity data*, 2018, AJ in press

Currie, T., Grady, C., **Cloutier, R.**, et al. *The Matryoshka Disk: Keck/NIRC2 discovery of a Solar system-scale, radially segregated residual protoplanetary disk around HD 141569A*, 2016, ApJL, 819, L26

Currie, T., **Cloutier, R.**, Brittain, S., et al. *Resolving the HD 100546 protoplanetary system with the Gemini Planet Imager: evidence for multiple forming, accreting planets*, 2015, ApJL, 814, L27

Currie, T., Burrows, A., Girard, J., **Cloutier, R.**, et al. *Deep thermal infrared imaging of HR 8799 bcde: new atmospheric constraints and limits on a fifth planet*, 2014, ApJ, 795, 133

Currie, T., **Cloutier, R.**, Debes, J., Kenyon, S., & Kaisler, D. *A deep Keck/NIRC2 search for thermal emission from planetary companions orbiting Fomalhaut*, 2013, ApJL, 777, L6

Preprints Under Review

Cloutier, R. *The independent discovery of planet candidates around low mass stars and astrophysical false positives in the first two TESS sectors*, 2018, AAS journals submitted

Non-Refereed Publications

Bouchy, F., et al. (including **Cloutier, R.**) *Near-InfraRed Planet Searcher to join HARPS on the ESO 3.6-metre Telescope*, 2017, The ESO Messenger, No. 169

Conference Proceedings

Lin, M. K. & **Cloutier, R.** *Gravitational instability of planetary gaps and its effect on orbital migration*, 2014, IAU Symposium, 299, 218

Awards & Recognitions

NSERC Postgraduate Scholarship - Doctoral
Department of Astronomy & Astrophysics (UofT), $63 000 *2016-2019*

Allen Yen Award for Excellence in Research
Department of Astronomy & Astrophysics (UofT), $1000 *2018*

Ontario Graduate Scholarship
Department of Astronomy & Astrophysics (UofT), $15 000 *2015-2016*

Lachlan Gilchrist Fellowship
Department of Astronomy & Astrophysics (UofT), $5000 $\times$ 4 *2015-2019*

School of Graduate Studies: Conference Travel Grant
Department of Astronomy & Astrophysics (UofT) and Centre for Planetary Sciences *2015*

Centre for Planetary Sciences Graduate Fellowship
Centre for Planetary Sciences, $10 000 *2014-2016*

NSERC Canadian Graduate Scholarship - Master's
Department of Astronomy & Astrophysics (UofT), $17 500 *2014-2015*

Mary H. Beatty Scholarship
Department of Astronomy & Astrophysics (UofT), $5000 *2014-2015*

Summer Undergraduate Research Program Award
Dunlap Institute for Astronomy & Astrophysics (UofT), $9000 *2013*

CITA Undergraduate Summer Research Award
Canadian Institute for Theoretical Astrophysics, $8000 *2012*

Conference Presentations

Talks

2nd Rencontres de Vietnam on Exoplanetary Science **Quy Nhon, Vietnam**
Discovering the Closest Habitable Worlds: Planet Detection Predictions for the SPIRou Legacy Survey-Planet Search *2018*

CASCA 2017 **Edmonton, AB**
Canadians on the Ground Searching for the Closest Habitable Worlds *2017*

SPIRou Science Meeting **Nice, France**
Simulated Searches for Small Radial Velocity Planets Amid Stellar Activity *2016*

CASCA 2016 **Winnipeg, MB**
Detecting Potentially Habitable Earth-like Planets around Cool Stars with SPIRou *2016*

Emerging Researchers in Exoplanet Science II **Cornell U.**
Detecting Potentially Habitable Earth-like Planets around Cool Stars with SPIRou *2016*

Posters

Exoplanets II **Cambridge, UK**
Predictive models of the RV requirement to measure transiting planet masses or, how long does it take to detect 50 small TESS planets? *2018*

Extremely Precise Radial Velocities III **Penn State**
Planet detection predictions from simulations of the SPIRou Legacy Survey Planet Search *2017*

Extreme Solar Systems III **Waikoloa, HI**
The Rossiter-McLaughlin effect of planets transiting M-dwarfs and its impact on planet detection in radial velocity surveys *2015*

CASCA 2015 **Hamilton, ON**
Could Jupiter have ejected a fifth giant planet from the solar system? *2015*

In the Spirit of Lyot **Montréal, QC**
An adaptive, locally-optimized method for imaging and characterizing exoplanets and disks *2015*

IAUS 299 **Victoria, BC**
Gravitational instability of planetary gaps and its effect on orbital migration *2013*

Media Coverage

Two Super-Earths around the red dwarf K2-18
University of Toronto & Institute for Resaerch on Exoplanets *December 2017*
UofT press release, iREx Press release, CTV television interview

Astronomers spy a nursery of baby exoplanets
Gemini Observatory *November 2015*
Gemini Observatory press release

Who kicked a giant planet our of the solar system 4 billions years ago? We're looking at you Jupiter
University of Toronto *October 2015*
UofT press release

Teaching & Mentoring

Undergraduate Teaching

Teaching Assistant
AST221: Stars and Planets *Fall 2017-2018*
- Leading tutorial sessions
- Holding office hours

Teaching Assistant
AST251: Life on Other Worlds *Winter 2018-2019*
- Creating course content
- Facilitating in-class discussions

Teaching Assistant
AST121: The Origin and Evolution of the Universe *Winter 2018*
- Leading help sessions
- Grading exams and assignments

Head Teaching Assistant
ASTA02 (UTSC): Beyond the Sun and Planets *Winter 2017*

Head Teaching Assistant
ASTA01 (UTSC): The Sun and Planets *Fall 2016*
- Designing weekly tutorials
- Managing teaching assistants
- Giving guest lectures
- Holding office hours
- Leading tutorial sessions
- Managing student grades

Teaching Assistant
CSCC01 (UTSC): Introduction to Software Engineering *Fall 2016*
- Advising students on astronomy topics related to their course project
- Holding office hours
- Answering student emails

Head Teaching Assistant
AST 201: Star and Galaxies *Winter 2016*

Head Teaching Assistant
AST 101: The Sun and its Neighbours *Fall 2015*
- Designing weekly tutorials
- Managing teaching assistants
- Leading tutorial sessions
- Presenting planetarium shows

Teaching Assistant
AST 101: The Sun and its Neighbours *2014-2015, 2018*

Teaching Assistant
AST 201: Star and Galaxies *2014-2015*
- Conducting online office hours
- Grading assignments and exams
- Leading campus observing sessions

Workshops

Workshop on Gaussian process regression in `python`
Centre for Planetary Sciences *Fall 2016*

Introductory workshop for undergraduate STEM researchers
Department of Astronomy & Astrophysics *Summer 2015*

Workshop for Ontario secondary school science teachers
York University *Summer 2015*

Student Mentoring

Mentoring incoming PhD students in their first-year
2015–2016
- Alysa Obertas (*University of British Columbia*)
- Adiv Paradise (*University of Minnesota*)

Outreach

Select Public Lectures & Presentations

Classroom Q & A Session
Christ the King Elementary School *Winter 2018*

AstroTour Public Lecture Series
University of Toronto *Fall 2017*
The Long Path Towards Finding Habitable Exo-Worlds

Graduate Speaker Series: Astronomy & Astrophysics
University of Toronto *Fall 2017*
The Long Path Towards Finding Habitable Exo-Worlds

Mystical Landscapes Planetarium Show
Art Gallery of Ontario *Winter 2016*

Public Lecture
North York Astronomical Association *Fall 2015*
Studying the Early Dynamical Evolution of the Solar System

Outreach Positions

UofT Planetarium
Planetarium Operator *2015–present*

UofT AstroTours
Executive Committee Member *2015–2017*

Professional Development

Institute for Scientist and Engineer Educators: Professional Development Program
Program Participant *2015*

Scinet Certificate in Scientific Computing
Successfully Completed *2015*

Teaching Assistant's Training Program: Teaching Fundamentals Certificate
Successfully Completed *2015*

Dunlap Institute Summer School: Introduction to Astronomical Instrumentation
Successfully Completed *2013*

Professional Positions

Journal Referee
The Astronomical Journal, Astronomy & Astrophysics

Committee member:
'Topical Team in Space Explorations: Origins (Galaxies, Stars, & Planets)'
Canadian Space Agency
I am part of the committee of Canadian astronomers tasked with evaluating the scientific benefits, challenges, and opportunities for Canadian participation in future science-based space missions. We advise the Canadian Space Agency on the ways in which we feel Canada should proceed in the field of astronomical discovery.