

# Thomas Vandal

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## Education

### PhD in Physics

*Astronomy and astrophysics, Université de Montréal*  
Advisor: Prof. René Doyon, fast track from M.Sc. in May 2021

Montréal  
2020-...

### Bachelor of Science (B.Sc.)

*Major Physics, McGill University*  
Final project: *Modelling Stellar Activity with Gaussian Processes: Application to the  $\beta$  Pictoris System*  
Advisor: Prof. René Doyon

Montréal  
2017-2020

### Diploma of Collegial Studies

*Natural Sciences, Collège Shawinigan*

Shawinigan  
2015-2017

## Research Experience

### PhD Student

*Trottier Institute for Research on Exoplanets (IREx), Université de Montréal*  
High-resolution spectroscopy, precise radial velocity,  
aperture masking and kernel phase interferometry, orbit modelling

Montréal  
2020-...

### Research Assistant

*Université de Montréal*  
Contribution to the APERO data reduction software for high resolution spectroscopy and precision radial velocity

Montréal  
2020-...

### Undergraduate researcher

*Trottier Institute for Research on Exoplanets (IREx)*  
Disentangling Stellar Activity in  $\beta$  Pictoris with Gaussian Processes  
Advisors: Prof. René Doyon, Dr. Julien Rameau and Dr. Lauren Weiss

Montréal  
2018-2019

### Summer intern in photonics

*AEPONYX*  
Computer-aided design, finite element analysis

Trois-Rivières  
2017

## Publications and Presentations

### Refereed Publications

- Vandal, T., Rameau, J., Doyon, R. *Dynamical Mass Estimates of the  $\beta$  Pictoris Planetary System through Gaussian Process Stellar Activity Modeling*. 2020, *AJ*, 160, 243.
- Deslières, A. et al. (inclusant Vandal, T.). *The Gl 229 System Revisited with the Line-by-line Framework: Planetary Signals Now Appear as Stellar Activity Ghosts*. 2025, *AJ*, 169, 182.
- Albert, L. et al. (inclusant Vandal, T.). *JWST 1.5  $\mu$ m and 4.8  $\mu$ m Photometry of Y Dwarfs*. 2025, *AJ*, 169, 163.
- Blakely, D. et al. (inclusant Vandal, T.). *The James Webb Interferometer: Space-based Interferometric Detections of PDS 70 b and c at 4.8  $\mu$ m*. 2025, *AJ*, 169, 137.
- Cooper, R. et al. (inclusant Vandal, T.). *Commissioning and calibration of the JWST aperture masking interferometry mode*. 2024, *SPIE Astronomical Telescopes and Instrumentation*.

- Malo, L. et al. (inclusant **Vandal, T.**). *NIRPS near-infrared spectrograph: AITV phase at ESO3.6m/La Silla*. 2024, [SPIE Astronomical Telescopes and Instrumentation](#).
- Artigau, É. et al. (inclusant **Vandal, T.**). *NIRPS first light and early science: breaking the 1 m/s RV precision barrier at infrared wavelengths*. 2024, [SPIE Astronomical Telescopes and Instrumentation](#).
- Jahandar, F. et al. (inclusant **Vandal, T.**). *Comprehensive High-resolution Chemical Spectroscopy of Barnard's Star with SPIRou*. 2024, [ApJ, 966, 56](#).
- Moutou, C. et al. (inclusant **Vandal, T.**). *Characterizing planetary systems with SPIRou: M-dwarf planet-search survey and the multiplanet systems GJ 876 and GJ 1148*. 2023, [A&A, 678, A207](#).
- Doyon, R. et al. (inclusant **Vandal, T.**). *The Near Infrared Imager and Slitless Spectrograph for the James Webb Space Telescope. I. Instrument Overview and In-flight Performance*. 2023, [PASP, 135, 098001](#).
- Calissendorff, P. et al. (inclusant **Vandal, T.**). *JWST/NIRCam Discovery of the First Y+Y Brown Dwarf Binary: WISE J033605.05-014350.4*. 2023, [ApJ, 937, L30](#).
- Sivaramakrishnan, A. et al. (inclusant **Vandal, T.**). *The Near Infrared Imager and Slitless Spectrograph for the James Webb Space Telescope – IV. Aperture Masking Interferometry*. 2022, [PASP, 135, 014502](#).
- Kammerer, J., Cooper, R., **Vandal, T.** et al. *The Near Infrared Imager and Slitless Spectrograph for JWST – V. Kernel Phase Imaging and Data Analysis*. 2022, [PASP, 135, 014502](#).
- Kammerer, J. et al. (inclusant **Vandal, T.**). *Performance of near-infrared high-contrast imaging methods with JWST from commissioning*. 2022, [SPIE Astronomical Telescopes and Instrumentation](#).
- Cadieux, C. et al. (inclusant **Vandal, T.**). *TOI-1452 b: SPIRou and TESS reveal a super-Earth in a temperate orbit transiting an M4 dwarf*. 2022, [AJ, 164, 96](#).
- Artigau, É et al. (inclusant **Vandal, T.**). *Line-by-line Velocity Measurements: an Outlier-resistant Method for Precision Velocimetry*. 2022, [AJ, 164, 84](#).
- Martioli, E. et al. (inclusant **Vandal, T.**). *TOI-1759 b: A transiting sub-Neptune around a low mass star characterized with SPIRou and TESS*. 2022, [A&A, 660, A86](#).
- Artigau, É et al. (inclusant **Vandal, T.**). *TOI-1278 B: SPIRou unveils a rare Brown Dwarf Companion in Close-In Orbit around an M dwarf*. 2021, [AJ, 162, 144](#).
- Pelletier, S et al. (inclusant **Vandal, T.**). *Where is the Water? Jupiter-like C/H ratio but strong H<sub>2</sub>O depletion found on τ Boötis b using SPIRou*. 2021, [AJ, 162, 73](#).

### [Oral Presentations \(Conferences and Seminars\)](#)

<b>Extreme Solar Systems V</b> <i>From HR 8799 to Y-dwarf binaries: Understanding planet formation across the stellar IMF with JWST Interferometry</i>	<b>Christchurch</b> 2024
<b>Improving JWST Data Products Workshop</b> <i>A Kernel Phase Pipeline for High-Contrast Imaging below the Diffraction Limit with JWST</i>	<b>Baltimore</b> 2023
<b>Center for research in astrophysics of Quebec (CRAQ) annual meeting</b> <i>Infrared interferometric imaging below the diffraction limit with JWST</i>	<b>Orford</b> 2022
<b>IREx Café</b> <i>Trottier Institute for Research on Exoplanets (IREx), Seminar 2022: Introduction to Aperture Masking and Kernel Phase Interferometry 2021: Introduction to Hamiltonian Monte-Carlo 2019: Gaussian Processes and their Applications in Astrophysics</i>	<b>Montréal</b> 2022
<b>SPIRou Legacy Survey Science Meeting</b> <i>Long term RV trend analysis and correction</i>	<b>Montréal</b> 2021
<b>Canadian Undergraduate Physics Conference (CUPC)</b> <i>Disentangling Stellar Activity in β Pictoris with Gaussian Processes</i>	<b>Montréal</b> 2019

## Poster Presentations

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<b>Canadian Astronomical Society (CASCA) Annual Meeting</b>	<b>Online</b>
<i>Detecting Hot Close-in Gas Giants Through Infrared High-Dispersion Spectroscopy</i>	2022
Available online: <a href="https://vandalt.github.io/casca2022/">https://vandalt.github.io/casca2022/</a>	
<b>ComSciCon-QC</b>	<b>Online</b>
<i>Chasseurs d'exoplanètes: à la recherche de planètes habitables avec les élèves du secondaire</i>	2021
Available online: <a href="https://vandalt.github.io/poster-comscicon-sprint-k218/">https://vandalt.github.io/poster-comscicon-sprint-k218/</a>	
<b>Exoplanets III</b>	<b>Online</b>
<i>Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process Stellar Activity Modeling</i>	2020
<b>Canadian Astronomical Society (CASCA) Annual Meeting</b>	<b>Online</b>
<i>Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process Stellar Activity Modeling</i>	2020

## Teaching and Mentoring

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<b>Teaching Assistant</b>	<b>Montréal</b>
<i>Université de Montréal</i>	2020-...
PHY3051/6051 - Modern data analysis in physics (Joint class BSc/PhD, Winter 2022-2024)	
PHY1234 - Introduction to numerical physics (Fall 2021, 2023)	
PHY1901 - Classical mechanics and modern physics (Fall 2020)	
<b>Individual Mentoring</b>	<b>Montréal</b>
<i>Centre de services scolaire de Montréal</i>	2024
One-to-one meetings with a gifted elementary school student	
<b>Individual Tutoring</b>	<b>Shawinigan</b>
<i>Cégep de Shawinigan</i>	2016-2017
Physics, mathematics, French literature	

## Additional scientific, volunteering and community activities

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### Conferences and workshop

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<b>Improving JWST Data Products Workshop</b>	<b>Baltimore</b>
<i>Space Telescope Science Institute</i>	2023
<b>Dot Astronomy 12</b>	<b>New-York</b>
<i>Flatiron Institute</i>	2023
Workshop in an "unconference" format about the use of modern computing facilities and software in astronomy	
<b>SPIE Astronomical Telescopes and Instrumentation</b>	<b>Montréal</b>
<i>SPIE</i>	2022
<b>Aperture Masking and Kernel Phase Hackathon</b>	<b>Online</b>
<i>University of California Irvine</i>	2021
Presentations and discussions about state-of-the-art techniques and standards for the years to come	
<b>AstroComm</b>	<b>Online</b>
<i>Center for research in astrophysics of Quebec (CRAQ)</i>	2021
Workshop about science communication for graduate students in astronomy	
<b>ComSciCon-QC</b>	<b>Online</b>
<i>ComSciCon workshop series</i>	2021
Workshop about science communication for graduate students	

<b>CASCA Annual Meeting</b>	<b>Online</b>
<i>Canadian Astronomical Society (CASCA)</i>	<i>2020-2022</i>
<b>Canadian Undergraduate Physics Conference (CUPC)</b>	<b>Montréal</b>
<i>McGill University</i>	<i>2019</i>
<b>Science Communication and Citizen Science</b>	
<b>IREx Career Days</b>	<b>Montréal</b>
<i>Trottier Institute for Research on Exoplanets (IREx), Volunteer</i>	<i>2022-2025</i>
Presentation and discussion with high-school students	
<b>Summer Interns Welcome Day</b>	<b>Montréal</b>
<i>Trottier Institute for Research on Exoplanets (IREx), Presenter</i>	<i>2021 and 2022</i>
Presentation about tools used in astronomy	
<b>Grande conférence de l'IREx 2021</b>	<b>Montréal</b>
<i>Trottier Institute for Research on Exoplanets (IREx), Volunteer</i>	<i>2021</i>
Welcoming the public and taking part in the Q&A at the end	
<b>InitiaSciences</b>	<b>Montréal</b>
<i>InitiaSciences, Treasurer and founding member</i>	<i>2021-2022</i>
Non-profit enabling high-school students to do research, supervised by graduate students	
<b>Un astronome dans votre classe Conferences</b>	<b>Montréal</b>
<i>Trottier Institute for Research on Exoplanets (IREx) and 24h de sciences, Speaker</i>	<i>2021-...</i>
Conference about astronomy for elementary schools, 3 presentations	
<b>Ma vie de chercheur en astronomie Conferences</b>	<b>Montréal</b>
<i>Trottier Institute for Research on Exoplanets (IREx) and</i>	<i>2021-...</i>
<i>Regroupement des cégeps de Montréal (programme acceScience), Speaker</i>	
5 presentations	
<b>Séjours d'immersion</b>	<b>Montréal</b>
<i>Projet SEUR, Université de Montréal, Speaker</i>	<i>2021</i>
Presentation about studying physics and exoplanet research	
<b>Sprint de sciences</b>	<b>Montréal</b>
<i>Coeur des sciences, Université du Québec à Montréal, Speaker</i>	<i>2020-2025</i>
Interactive conference about exoplanets for high-schools, approximately 10 per semester	
<b>Open-source software contributions</b>	
<i>Contribution to software projects used in astronomy</i>	<i>2020-...</i>
Full list available on GitHub: <a href="https://github.com/vandalt">https://github.com/vandalt</a>	
<b>CRAQ Calendar</b>	<b>Montréal</b>
<i>Center for research in astrophysics of Quebec (CRAQ), Volunteer</i>	<i>2020 and 2021</i>
Translation and management of the distribution list	
<b>AstroMIL: Astronomy Day on the MIL Campus</b>	<b>Montréal</b>
<i>Université de Montréal, Volunteer</i>	<i>2018 and 2019</i>
<b>Eurêka! Festival</b>	<b>Montréal</b>
<i>CRAQ and Faculté des Arts et Sciences de l'Université de Montréal, Presenter</i>	<i>2018 and 2022</i>
<b>Organisation d'événements</b>	
<b>Canadian Undergraduate Physics Conference (CUPC)</b>	<b>Montréal</b>
<i>McGill University, Vice-president of events</i>	<i>2019</i>
Sponsorship search and event planning	

## Awards & Recognitions

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### Université de Montréal

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#### **ESP Excellence Scholarship - Alma Mater**

*Études supérieures et postdoctorales (ESP), Université de Montréal, \$10,000*

2022

#### **Lumbroso IREx Ambassador Grant**

*Trottier Institute for Research on Exoplanets (IREx), \$2000*

2022

#### **Doctoral research scholarship (B2X)**

*Fonds de recherche du Québec - Nature et technologies, \$84,000*

2022-2026

\$21,000 per year for 4 years

#### **Teaching Award "Petit Nobel - NanoNobel"**

*Department of Physics, Université de Montréal*

2022

Excellence in teaching award for a teaching assistant, voted by 3rd year undergraduate students

#### **Financial support scholarship**

*Université de Montréal, \$3000*

2022

Awarded for the excellence of my 2021-2022 NSERC application

#### **Bourse d'études 3e cycle (Doctoral Scholarship)**

*Fondation des Anciens de Shawinigan, \$5000*

2022

#### **Bourse pour passage accéléré au doctorat (Scholarship for fast track to PhD)**

*Université de Montréal, \$7000*

2021

#### **Master's research scholarship (B1X)**

*Fonds de recherche du Québec - Nature et technologies, \$21,000*

2021

Value adjusted for PhD after fast track

#### **Bourse d'études 2e cycle (Master's Scholarship)**

*Fondation des Anciens de Shawinigan, \$2000*

2020

#### **Technologies for Exo Planetary Science Scholarship**

*NSERC (CREATE program), \$7500*

2020

### McGill University

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#### **Trottier Excellence Grant for Summer Interns**

*Trottier Institute for Research on Exoplanets (IREx), \$6000*

2018

#### **R.E. Powell Scholarship**

*Entrance Scholarship, McGill University, \$5000*

2017

### Cégep de Shawinigan

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#### **Governor General's Academic Medal**

*Highest R-score, Cégep de Shawinigan*

2017