

# Thomas Vandal

✉ [thomas.vandal@umontreal.ca](mailto:thomas.vandal@umontreal.ca) •  [vandalt](https://github.com/vandalt)

## Education

<b>PhD in Physics</b> <i>Astronomy and astrophysics, Université de Montréal</i> Advisor: Prof. René Doyon, fast track from M.Sc. in May 2021	<b>Montréal</b> 2020-...
<b>Bachelor of Science (B.Sc.)</b> <i>Major Physics, McGill University</i> Final project: <i>Modelling Stellar Activity with Gaussian Processes: Application to the <math>\beta</math> Pictoris System</i> Advisor: Prof. René Doyon	<b>Montréal</b> 2017-2020
<b>Diploma of Collegial Studies</b> <i>Natural Sciences, Collège Shawinigan</i>	<b>Shawinigan</b> 2015-2017

## Research Experience

<b>PhD Student</b> <i>Trottier Institute for Research on Exoplanets (IREx), Université de Montréal</i> High-resolution spectroscopy, precise radial velocity, aperture masking and kernel phase interferometry, orbit modelling	<b>Montréal</b> 2020-...
<b>Research Assistant</b> <i>Université de Montréal</i> Contribution to the APERO data reduction software for high resolution spectroscopy and precision radial velocity	<b>Montréal</b> 2020-...
<b>Undergraduate researcher</b> <i>Trottier Institute for Research on Exoplanets (IREx)</i> Disentangling Stellar Activity in $\beta$ Pictoris with Gaussian Processes Advisors: Prof. René Doyon, Dr. Julien Rameau and Dr. Lauren Weiss	<b>Montréal</b> 2018-2019
<b>Summer intern in photonics</b> <i>AEPONYX</i> Computer-aided design, finite element analysis	<b>Trois-Rivières</b> 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.

Parc, L. et al. (including **Vandal, T.**) *NIRPS and TESS reveal a peculiar system around the M dwarf TOI-756: A transiting sub-Neptune and a cold eccentric giant*. 2025, *A&A*, **702**, A138.

Bazinet, L. et al. (including **Vandal, T.**) *Quantifying thermal water dissociation in the dayside photosphere of WASP-121 b using NIRPS*. 2025, *A&A*, **701**, A276.

Gomes da Silva, J. et al. (including **Vandal, T.**) *Blind search for activity-sensitive lines in the near-infrared using HARPS and NIRPS observations of Proxima and Gl 581*. 2025, *A&A*, **700**, A177.

Vaulato, V. et al. (including **Vandal, T.**) *Hydride ion continuum hides absorption signatures in the NIRPS near-infrared transmission spectrum of the ultra-hot gas giant WASP-189b*. 2025, *A&A*, **700**, A9.

Bouchy, F. et al. (including **Vandal, T.**) *NIRPS joining HARPS at ESO 3.6 m: On-sky performance and science objectives*. 2025, [A&A, 700, A10](#).

Allart, R. et al. (including **Vandal, T.**) *NIRPS detection of delayed atmospheric escape from the warm and misaligned Saturn-mass exoplanet WASP-69 b*. 2025, [A&A, 700, A7](#).

Suárez Mascareño, A. et al. (including **Vandal, T.**) *Diving into the planetary system of Proxima with NIRPS: Breaking the metre per second barrier in the infrared*. 2025, [A&A, 700, A11](#).

Doyon, R. et al. (including **Vandal, T.**) *NIRPS Joins HARPS: Setting New Standards at Infrared Wavelengths*. 2025, [The Messenger, 194, 13](#).

Deslières, A. et al. (including **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. (including **Vandal, T.**) *JWST 1.5  $\mu\text{m}$  and 4.8  $\mu\text{m}$  Photometry of Y Dwarfs*. 2025, [AJ, 169, 163](#).

Blakely, D. et al. (including **Vandal, T.**) *The James Webb Interferometer: Space-based Interferometric Detections of PDS 70 b and c at 4.8  $\mu\text{m}$* . 2025, [AJ, 169, 137](#).

Cooper, R. et al. (including **Vandal, T.**) *Commissioning and calibration of the JWST aperture masking interferometry mode*. 2024, [Optical and Infrared Interferometry and Imaging IX, 13095, 130952R](#).

Malo, L. et al. (including **Vandal, T.**) *NIRPS near-infrared spectrograph: AITV phase at ESO3.6m/La Silla*. 2024, [Ground-based and Airborne Instrumentation for Astronomy X, 13096, 1309646](#).

Artigau, É. et al. (including **Vandal, T.**) *NIRPS first light and early science: breaking the 1 m/s RV precision barrier at infrared wavelengths*. 2024, [Ground-based and Airborne Instrumentation for Astronomy X, 13096, 130960C](#).

Jahandar, F. et al. (including **Vandal, T.**) *Comprehensive High-resolution Chemical Spectroscopy of Barnard's Star with SPIRou*. 2024, [The Astrophysical Journal, 966, 56](#).

Moutou, C. et al. (including **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. (including **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](#).

Cortés-Zuleta, P. et al. (including **Vandal, T.**) *Optical and near-infrared stellar activity characterization of the early M dwarf Gl 205 with SOPHIE and SPIRou*. 2023, [A&A, 673, A14](#).

Calissendorff, P. et al. (including **Vandal, T.**) *JWST/NIRCam Discovery of the First Y+Y Brown Dwarf Binary: WISE J033605.05-014350.4*. 2023, [The Astrophysical Journal, 947, L30](#).

Rigby, J. et al. (including **Vandal, T.**) *The Science Performance of JWST as Characterized in Commissioning*. 2023, [PASP, 135, 048001](#).

Kiefer, F. et al. (including **Vandal, T.**) *A sub-Neptune planet around TOI-1695 discovered and characterized with SPIRou and TESS*. 2023, [A&A, 670, A136](#).

Sivaramakrishnan, A. et al. (including **Vandal, T.**) *The Near Infrared Imager and Slitless Spectrograph for the James Webb Space Telescope. IV. Aperture Masking Interferometry*. 2023, [PASP, 135, 015003](#).

Kammerer, J. et al. (including **Vandal, T.**) *The Near Infrared Imager and Slitless Spectrograph for JWST. V. Kernel Phase Imaging and Data Analysis*. 2023, [PASP, 135, 014502](#).

Cook, N. et al. (including **Vandal, T.**) *APERIO: A Pipeline to Reduce Observations-Demonstration with SPIRou*. 2022, [PASP, 134, 114509](#).

Cadieux, C. et al. (including **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. (including **Vandal, T.**) *Line-by-line Velocity Measurements: an Outlier-resistant Method for Precision Velocimetry*. 2022, [AJ, 164, 84](#).

Kammerer, J. et al. (including **Vandal, T.**) *Performance of near-infrared high-contrast imaging methods with JWST from commissioning*. 2022, [Space Telescopes and Instrumentation 2022: Optical, Infrared, and Millimeter Wave, 12180, 121803N](#).

Martoli, E. et al. (including **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. (including **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. (including **Vandal, T.**) *Where Is the Water? Jupiter-like C/H Ratio but Strong H<sub>2</sub>O Depletion Found on  $\tau$  Boötis b Using SPIRou*. 2021, *AJ*, 162, 73.

## Oral Presentations (Conferences and Seminars)

**Extreme Solar Systems V** **Christchurch**  
*From HR 8799 to Y-dwarf binaries: Understanding planet formation across the stellar IMF with JWST Interferometry* 2024

**Improving JWST Data Products Workshop** **Baltimore**  
*A Kernel Phase Pipeline for High-Contrast Imaging below the Diffraction Limit with JWST* 2023

**Center for research in astrophysics of Quebec (CRAQ) annual meeting** **Orford**  
*Infrared interferometric imaging below the diffraction limit with JWST* 2022

**IREx Café** **Montréal**  
*Trottier Institute for Research on Exoplanets (IREx), Seminar* 2022  
 2022: *Introduction to Aperture Masking and Kernel Phase Interferometry*  
 2021: *Introduction to Hamiltonian Monte-Carlo*  
 2019: *Gaussian Processes and their Applications in Astrophysics*

**SPIRou Legacy Survey Science Meeting** **Montréal**  
*Long term RV trend analysis and correction* 2021

**Canadian Undergraduate Physics Conference (CUPC)** **Montréal**  
*Disentangling Stellar Activity in  $\beta$  Pictoris with Gaussian Processes* 2019

## Poster Presentations

**Canadian Astronomical Society (CASCA) Annual Meeting** **Online**  
*Detecting Hot Close-in Gas Giants Through Infrared High-Dispersion Spectroscopy* 2022  
 Available online: <https://vandalt.github.io/casca2022/>

**ComSciCon-QC** **Online**  
*Chasseurs d'exoplanètes: à la recherche de planètes habitables avec les élèves du secondaire* 2021  
 Available online: <https://vandalt.github.io/poster-comscicon-sprint-k218/>

**Exoplanets III** **Online**  
*Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process Stellar Activity Modeling* 2020

**Canadian Astronomical Society (CASCA) Annual Meeting** **Online**  
*Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process Stellar Activity Modeling* 2020

## Teaching and Mentoring

**Teaching Assistant** **Montréal**  
*Université de Montréal* 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)

**Individual Mentoring** **Montréal**  
*Centre de services scolaire de Montréal* 2024

One-to-one meetings with a gifted elementary school student

## Additional scientific, volunteering and community activities

### Conferences and workshop

<b>Improving JWST Data Products Workshop</b> <i>Space Telescope Science Institute</i>	<b>Baltimore</b> 2023
<b>Dot Astronomy 12</b> <i>Flatiron Institute</i> Workshop in an "unconference" format about the use of modern computing facilities and software in astronomy	<b>New-York</b> 2023
<b>SPIE Astronomical Telescopes and Instrumentation</b> <i>SPIE</i>	<b>Montréal</b> 2022
<b>Aperture Masking and Kernel Phase Hackathon</b> <i>University of California Irvine</i> Presentations and discussions about state-of-the-art techniques and standards for the years to come	<b>Online</b> 2021
<b>AstroComm</b> <i>Center for research in astrophysics of Quebec (CRAQ)</i> Workshop about science communication for graduate students in astronomy	<b>Online</b> 2021
<b>ComSciCon-QC</b> <i>ComSciCon workshop series</i> Workshop about science communication for graduate students	<b>Online</b> 2021
<b>CASCA Annual Meeting</b> <i>Canadian Astronomical Society (CASCA)</i>	<b>Online</b> 2020-2022
<b>Canadian Undergraduate Physics Conference (CUPC)</b> <i>McGill University</i>	<b>Montréal</b> 2019

### Science Communication and Citizen Science

<b>IREx Career Days</b> <i>Trottier Institute for Research on Exoplanets (IREx), Volunteer</i> Presentation and discussion with high-school students	<b>Montréal</b> 2022-2025
<b>Summer Interns Welcome Day</b> <i>Trottier Institute for Research on Exoplanets (IREx), Presenter</i> Presentation about tools used in astronomy	<b>Montréal</b> 2021 and 2022
<b>Grande conférence de l'IREx 2021</b> <i>Trottier Institute for Research on Exoplanets (IREx), Volunteer</i> Welcoming the public and taking part in the Q&A at the end	<b>Montréal</b> 2021
<b>InitiaSciences</b> <i>InitiaSciences, Treasurer and founding member</i> Non-profit enabling high-school students to do research, supervised by graduate students	<b>Montréal</b> 2021-2022
<b>Un astronome dans votre classe Conferences</b> <i>Trottier Institute for Research on Exoplanets (IREx) and 24h de sciences, Speaker</i> Conference about astronomy for elementary schools, 3 presentations	<b>Montréal</b> 2021-...
<b>Ma vie de chercheur en astronomie Conferences</b> <i>Trottier Institute for Research on Exoplanets (IREx) and Regroupement des cégeps de Montréal (programme acceScience), Speaker</i> 5 presentations	<b>Montréal</b> 2021-...

<b>Séjours d'immersion</b> <i>Projet SEUR, Université de Montréal, Speaker</i> Presentation about studying physics and exoplanet research	<b>Montréal</b> 2021
<b>Sprint de sciences</b> <i>Coeur des sciences, Université du Québec à Montréal, Speaker</i> Interactive conference about exoplanets for high-schools, approximately 10 per semester	<b>Montréal</b> 2020-2025
<b>Open-source software contributions</b> <i>Contribution to software projects used in astronomy</i> Full list available on GitHub: <a href="https://github.com/vandalt">https://github.com/vandalt</a>	2020-...
<b>CRAQ Calendar</b> <i>Center for research in astrophysics of Quebec (CRAQ), Volunteer</i> Translation and management of the distribution list	<b>Montréal</b> 2020 and 2021
<b>AstroMIL: Astronomy Day on the MIL Campus</b> <i>Université de Montréal, Volunteer</i>	<b>Montréal</b> 2018 and 2019
<b>Eurêka! Festival</b> <i>CRAQ and Faculté des Arts et Sciences de l'Université de Montréal, Presenter</i>	<b>Montréal</b> 2018 and 2022
<b>Organisation d'événements</b> .....	
<b>Canadian Undergraduate Physics Conference (CUPC)</b> <i>McGill University, Vice-president of events</i> Sponsorship search and event planification	<b>Montréal</b> 2019

## Awards & Recognitions

<b>Université de Montréal</b> .....	
<b>ESP Excellence Scholarship - Alma Mater</b> <i>Études supérieures et postdoctorales (ESP), Université de Montréal, \$10,000</i>	2022
<b>Lumbroso IREx Ambassador Grant</b> <i>Trottier Institute for Research on Exoplanets (IREx), \$2000</i>	2022
<b>Doctoral research scholarship (B2X)</b> <i>Fonds de recherche du Québec - Nature et technologies, \$84,000</i> \$21,000 per year for 4 years	2022-2026
<b>Teaching Award "Petit Nobel - NanoNobel"</b> <i>Department of Physics, Université de Montréal</i> Excellence in teaching award for a teaching assistant, voted by 3rd year undergraduate students	2022
<b>Financial support scholarship</b> <i>Université de Montréal, \$3000</i> Awarded for the excellence of my 2021-2022 NSERC application	2022
<b>Bourse d'études 3e cycle (Doctoral Scholarship)</b> <i>Fondation des Anciens de Shawinigan, \$5000</i>	2022
<b>Bourse pour passage accéléré au doctorat (Scholarship for fast track to PhD)</b> <i>Université de Montréal, \$7000</i>	2021
<b>Master's research scholarship (B1X)</b> <i>Fonds de recherche du Québec - Nature et technologies, \$21,000</i> Value adjusted for PhD after fast track	2021
<b>Bourse d'études 2e cycle (Master's Scholarship)</b> <i>Fondation des Anciens de Shawinigan, \$2000</i>	2020

<b>Technologies for Exo Planetary Science Scholarship</b> <i>NSERC (CREATE program), \$7500</i>	2020
<b>McGill University</b> .....	
<b>Trottier Excellence Grant for Summer Interns</b> <i>Trottier Institute for Research on Exoplanets (IREx), \$6000</i>	2018
<b>R.E. Powell Scholarship</b> <i>Entrance Scholarship, McGill University, \$5000</i>	2017
<b>Cégep de Shawinigan</b> .....	
<b>Governor General's Academic Medal</b> <i>Highest R-score, Cégep de Shawinigan</i>	2017