

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 β 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 β 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 β 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 μ m and 4.8 μ 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 μ 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.**) *APER0: 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](#).

Martioli, 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 H₂O Depletion Found on τ Boötis b Using SPIRou*. 2021, *AJ*, **162**, 73.

Oral Presentations (Conferences and Seminars)

Extreme Solar Systems V

From HR 8799 to Y-dwarf binaries: Understanding planet formation across the stellar IMF with JWST Interferometry

Christchurch

2024

Improving JWST Data Products Workshop

A Kernel Phase Pipeline for High-Contrast Imaging below the Diffraction Limit with JWST

Baltimore

2023

Center for research in astrophysics of Quebec (CRAQ) annual meeting

Infrared interferometric imaging below the diffraction limit with JWST

Orford

2022

IREx Café

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

Montréal

2022

SPIRou Legacy Survey Science Meeting

Long term RV trend analysis and correction

Montréal

2021

Canadian Undergraduate Physics Conference (CUPC)

Disentangling Stellar Activity in β Pictoris with Gaussian Processes

Montréal

2019

Poster Presentations

Canadian Astronomical Society (CASCA) Annual Meeting

Detecting Hot Close-in Gas Giants Through Infrared High-Dispersion Spectroscopy

Online

2022

ComSciCon-QC

Chasseurs d'exoplanètes: à la recherche de planètes habitables avec les élèves du secondaire

Online

2021

Available online: <https://vandalt.github.io/casca2022/>

Exoplanets III

Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process

Online

2020

Stellar Activity Modeling

Canadian Astronomical Society (CASCA) Annual Meeting

Dynamical Mass Estimates of the beta Pictoris Planetary System through Gaussian Process

Online

2020

Stellar Activity Modeling

Teaching and Mentoring

Teaching Assistant

Université de Montréal

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

Centre de services scolaire de Montréal

Montréal

2024

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

Individual Tutoring
Cégep de Shawinigan
Physics, mathematics, French literature

Shawinigan
2016-2017

Additional scientific, volunteering and community activities

Conferences and workshop

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

Science Communication and Citizen Science

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

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

Awards & Recognitions

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

Technologies for Exo Planetary Science Scholarship
NSERC (*CREATE* program), \$7500

2020

McGill University

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

Governor General's Academic Medal

Highest R-score, Cégep de Shawinigan

2017