Curriculum Vitae
Sébastien Bertrand, PhD

Current address

Office PSB 320
Department of Mathematics
College of Natural Sciences
University of Hawai'i at Mānoa
2565 McCarthy Mall, Honolulu, Hi, 96822
United States of America

Email addresses

Phone number

Cellphone: 

Personal data

First name: Sébastien Surname: Bertrand Pronouns: he/him/his

Current position: Temporary Assistant Professor (since 2021/08)
Department of Mathematics, College of Natural Sciences,
University of Hawai'i at Mānoa (UHawaii), United States of America

Past positions:

- Research associate (2020/01–2021/07), Katedra Fyziky, ČVUT
- Pedagogical partner (2021/03–2021/06)), École Secondaire Val-Mauricie (Canada)
- Postdoctoral fellow (2018/01–2021/08), NSERC and FRQNT (Katedra Fyziky, ČVUT)
- Scientific revisor (2014) Édition Groupe Modulo:
  WE Boyce and RC Diprima (2015) *Équations différentielles*, 2nd French edition
  (Groupe Modulo, Montreal) ISBN: 978-2-89732-014-0

Education

- **Ph.D.** in applied mathematics (2013/09 – 2017/10)
  Department of Mathematics and Statistics, University of Montreal
  Thesis title: Extensions supersymétriques des équations structurelles
  des supervariétés plongées dans des superespaces

- **M.Sc.** in applied mathematics and computer science (2012/01 – 2013/08)
  Department of Mathematics and Computer Sciences, UQTR
  Thesis title: Surfaces solitoniques plongées dans des algèbres de Lie
  associées aux modèles intégrables

- **B.Sc.** in physics (2009/01 – 2012/04) Department of Physics, UQTR

Fields of research

- Superintegrable Hamiltonian systems with magnetic fields
- Representation of Racah algebra for higher rank
- Special functions with an indecomposable $\mathfrak{sl}(2)$ representation
- Discretized physical systems and their symmetries
- Differential geometry behind supersymmetric integrable models

Symbolic/numerical computing environment mastery

- Maple, Mathematica, MatLab, Python

Selected prizes, mentions and grants

- **Graduate faculty appointment** (level 1) University of Hawai'i at Mānoa (2023/01)
- **Excellence in Teaching Award** for the AY22-23 cycle (nomination, but ineligible)
- **IOP Trusted reviewer** status (2021/01)
- **Outstanding reviewer award** 2020, J. Phys. A: Math. Theor. Institute of Physics (IOP)
- **Postdoctoral fellowship** (2020/01 – 2021/12)
  Natural Sciences and Engineering Research Council of Canada (NSERC)
- **Postdoctoral research fellowship** (2018/01 – 2019/12)
  Fonds de Recherche du Québec : Nature et Technologies (FRQNT)
- Doctoral thesis with mention **exceptional**
- **Best student 2017** of the Mathematical Physics Laboratory, Centre de Recherches Mathématiques
- **Finishing PhD scholarship** (4 years and less) (2016/09 – 2017/08)
  Faculté des Études Supérieures et Postdoctorales, University of Montreal
- **PhD research scholarship** (2013/09 – 2016/04)
  Fonds de Recherche du Québec : Nature et Technologies (FRQNT)
- **Best master's thesis 2013** in natural sciences and engineering (UQTR)
- **Undergraduate student research award** (2011/05 – 2011/08)
  Natural Sciences and Engineering Research Council of Canada (NSERC)
- **Leadership scholarship** (2007/09 – 2008/08)
  Canada Millennium Scholarship Foundation

Teaching

- **Lecturer**
  - Math 407 (Numerical Analysis), UHawaii, F2022
  - Math 307 (Linear Algebra and Differential Equations), UHawaii, S2022 and S2023
  - Math 302 (Introduction to Differential Equations I), UHawaii, F2021
  - Math 242 (Calculus II), UHawaii, F2022 and S2023
  - Math 241 (Calculus I), UHawaii, F2021 and S2022
  - 02SMF (Seminar matematické fyziky), ČVUT, F2020
  - 02DRG (Diferenciální rovnice, symetrie a grupy), ČVUT, F2019
- **Teaching assistant** (2011/09 – 2016/04)
  Department of Physics / Department of Mathematics and Computer Sciences, UQTR
  - MAP1006 - MAP1007 - MAP1008 (Applied mathematics I - II - III)
  - MPU1027 (Differential equations)
  - MPU1051 - MPU1052 (Elementary differential / integral calculus)
  - PHQ1013 (Optics)
  - PHQ1023 (Classical mechanics II)
  - PHQ1030 (Elementary particle physics)
  - PHQ1038 (Advanced techniques of solution for physical problems)
  - PMO1010 - PMO1008 (Quantum mechanics I - II)
- **Teacher**/teaching assistant: Club de Karaté Mauricie (2002 – 2017)

Selected community outreach

- Event supervisor for the Hawaiian State Science Olympiad (2023) Crave the Wave – Division B
- Collaborator for the outreach project 808 Math Island Style: CMSEID
- Recruitment speaker for new students in mathematical physics (2018/04) ČVUT, Praha, ČR
- Organization helper (2011/07) The International Conference on Difference Equations and Applications (ICDEA) 2011, Université du Québec à Trois-Rivières (UQTR), Trois-Rivières, Canada
- Co-organizer of the annual provincial Seikokai championship, Canada (2009-2015)
- Invited karate teacher for disadvantaged children
- Teaching self-defense techniques to physically abused women
- Karate coach for the Jeux du Québec (kids) and for the Quebec team selections (teenagers and adults)

Referee contributions

- **Referee** for: – Journal of Physics A: Mathematical and Theoretical (9)
  – Physics Letter A (1)
  – New Journal of Physics (2)
  – Physica Scripta (2)
  – Energies (1)
  – Open Physics (1)
  – Journal of Physics Communications (1)
  – Aerospace (1)
  – Applied Science (1)

Articles in international peer-reviewed journals

1. **Bertrand S**, Kubů O and Šnobl L (2020) On superintegrability of 3D axially-symmetric non-subgroup-type systems with magnetic fields, *J. Phys A: Math. theor.* **54** 015201 (28pp). [ArXiv:2008.01987]
2. **Bertrand S** and Šnobl L (2019) On rotationally invariant integrable and superintegrable classical systems in magnetic fields with non-subgroup type integrals, *J. Phys. A: Math. Theor.* **52** 195201 (25pp). [ArXiv:1812.09399]
3. **Bertrand S** and Grundland AM (2018) Structural equations of supermanifolds immersed in the superspace $M^{(3|2)}(c)$ with a prescribed curvature, *J. Phys. A: Math. Theor.* **51** 305202 (20pp). [ArXiv:1806.04897]
4. **Bertrand S** (2017) On geometric aspects of the supersymmetric Fokas–Gel'fand immersion formula, *J. Phys. A: Math. Theor.* **50** 375206 (19pp). [ArVix:1706.06224]
5. **Bertrand S** (2017) On integrability aspects of the supersymmetric sine-Gordon equation, *J. Phys. A: Math. Theor.* **50** 165202 (14pp). [ArXiv:1703.07925]
6. **Bertrand S** and Grundland AM (2016) Supersymmetric versions of the Fokas–Gel'fand formula for immersion, *J. Phys. A: Math. Theor.* **49** 305201 (20pp). [ArXiv:1610.01029]
7. **Bertrand S**, Grundland AM and Hariton AJ (2015) On the integrability of supersymmetric versions of the structural equations for conformally parametrized surfaces, *SIGMA* **11** 046 (16pp). [ArXiv:1502.02948]
8. **Bertrand S**, Grundland AM and Hariton AJ (2015) Supersymmetric versions of the equations of conformally parametrized surfaces, *J. Phys. A: Math. Theor.* **48** 175208 (37pp). [ArXiv:1504.08260]

Preprints

1. **Bertrand S** and Nucci MC (2023) Linearity of minimally superintegrable systems in a static electromagnetic field (Submitted)
2. **Bertrand S** (2023) Algebraic discretization of time-independent Hamiltonian systems using a Lie-group/algebra approach. [ArXiv:2008.03055]
3. Post S and **Bertrand S** (2023) Verma modules for the rank-two Racah algebra

Proceedings article

1. **Bertrand S** (2016) Supersymmetric versions and integrability of conformally parametrized surfaces, *J. Phys.: Conf. Ser. 670*, XXIII International Conference on Integrable Systems and Quantum Symmetries (ISQS-23), Prague, Czech Republic (012009) IOP Publishing.
DOI:10.1088/1742-6596/670/1/012009

Recent presentations

1. 2021/10 - Colloquium, Department of Mathematics, University of Hawai'i at Mānoa, USA
2. 2020/01 - The 29th Winter School on Mathematical Physics, Janské Lázně, Czech Republic
3. 2019/09 - Conference of the Department of Chemistry, Biochemistry and Physics, UQTR, Canada
4. 2019/09 - Mathematical physics seminar of the Centre de Recherches Mathématiques, University of Montreal, Canada
5. 2019/07 - The 26th international conference on Integrable Systems and Quantum Symmetries (ISQS-26), Czech Technical University in Prague, Prague, Czech Republic
6. 2019/06 - XXIst International Conference: Geometry, Integrability and Quantization (GIP-2018), Varna, Bulgaria
7. 2018/07 - Young Researchers Symposium, XIX International Congress on Mathematical Physics (ICMP 2018), McGill University, Montreal, Canada
8. 2018/07 - The 32nd International Colloquium on Group Theoretical Methods in Physics (Group32), Czech Technical University in Prague, Prague, Czech Republic
9. 2017/06 - The 25th international conference on Integrable Systems and Quantum Symmetries (ISQS-25), Czech Technical University in Prague, Prague, Czech Republic
10. 2017/05 - Colloque panquébécois des étudiants de l'ISM, Université du Québec à Trois-Rivières, Trois-Rivières, Canada

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Sébastien Bertrand, PhD — March 1^{st}, 2023

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