

This is a draft version only. Do not submit to any funding organization. Only the final version from the History page can be submitted. It is strictly forbidden to submit this draft version to an organization that is not a member of the CCV. The complete list of CCV members is available at www.ccv-cvc.ca

Professor Moritz H Heimpel

Correspondence language: English

Sex: Male

Date of Birth: 4/03

Canadian Residency Status: Permanent Resident

Contact Information

The primary information is denoted by (*)

Address

Primary Affiliation (*)

Department of Physics
4-181 CCIS
Edmonton Alberta T6G2E1
Canada

Telephone

Mobile 780-9053950

Work (*) 780-4923519

Email

Work (*) mheimpel@ualberta.ca

Website

<https://uofa.ualberta.ca/physics/people/people-collection/moritz-heimpel>

This is a draft version only. Do not submit to any funding organization. Only the final version from the History page can be submitted. It is strictly forbidden to submit this draft version to an organization that is not a member of the CCV. The complete list of CCV members is available at www.ccv-cvc.ca



Protected when completed

Professor Moritz Heimpel

Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
German	Yes	Yes	Yes	Yes	Yes

Degrees

- 1993/7 - 1995/12 Doctorate, Geophysics, Johns Hopkins University
Degree Status: Completed
Thesis Title: Seismodynamics of the Earth's Lithosphere: Numerical and laboratory studies of fracture and flow in plate boundary regions
- 1990/9 - 1993/6 Master's non-Thesis, Geophysics, Johns Hopkins University
Degree Status: Completed
- 1985/9 - 1989/12 Bachelor's, Physics, University of California, Berkeley
Degree Status: Completed

User Profile

Fields of Application: Foundations and Knowledge Acquisition, Environment, Communication and Information Technologies

Areas of Research: Geodynamics, Solar and Planetary Systems, Fluid Mechanics, Turbulence, Modelization and Simulation

Research Specialization Keywords: Geophysics, Geodynamics, Planetary Science, Magnetohydrodynamics, Computational Fluid dynamics

Research Disciplines: Earth Science, Astronomy and Astrophysics, Computer Science

Employment

- 2006/12 Associate professor of Geophysics and Physics
Physics, University of Alberta
Full-time, Associate Professor
Tenure Status: Tenure

Affiliations

The primary affiliation is denoted by (*)

- 2007/3 Principal Investigator, Physics, Institute of Space Science, Exploration and Technology (ISSET), University of Alberta
- 1999/9 Director, July 1, 2009 - June 30, 2012 Member 1999- present, Physics, Institute for Geophysical Research, University of Alberta
- (*) 1999/7 Assistant professor (1999 - 2006) Associate professor (2006 - present), Physics, University of Alberta

Student/Postdoctoral Supervision

Bachelor's [n=1]

2012/5 - 2012/8
Co-Supervisor Jakob Hinney (Completed) , University of Alberta
Thesis/Project Title: Summer internship contributing to Bachelor of Science at Ludwig-Maximilians Universität München, Germany.
Present Position: Master Student at the University of Strathclyde, Glasgow, UK.

Master's Thesis [n=4]

2015/9
Principal Supervisor Benjamin Ocampo (In Progress) , University of Alberta
Student Degree Start Date: 2015/9
Student Degree Expected Date: 2017/8
Student Canadian Residency Status: Canadian Citizen
Thesis/Project Title: Comparison of numerical simulations from anelastic deep convection models and general circulation models applied to planetary atmospheres
Present Position: Student

2014/9
Principal Supervisor Keith Cuff (In Progress) , University of Alberta
Student Degree Start Date: 2014/9
Student Degree Expected Date: 2016/8
Thesis/Project Title: Dynamics of plumes and vortices in planetary flows
Present Position: Student

2008/5 - 2008/8
Co-Supervisor Maylis Landeau (Completed) , University of Alberta
Thesis/Project Title: Fluid Mechanics, Fundamentals and Applications.
Present Position: PhD Student, IPGP, Paris, France

2006/9 - 2012/11
Principal Supervisor Christian Escalante (Completed) , University of Alberta
Thesis/Project Title: High-Resolution Imaging of the Mantle Transition Zone Beneath Japan from Sparse Receiver Functions
Present Position: Geophysicist, BHP Billiton Ltd.

Doctorate [n=2]

2007/9 - 2010/7
Principal Supervisor Wolfgang Engler (Withdrawn) , University of Alberta
Thesis/Project Title: A new computational numerical dynamo model using the anelastic approximation.
Present Position: Staff Scientist, Vision Smart, Edmonton

2002/9 - 2007/8
Principal Supervisor Natalia Gomez Perez (Completed) , University of Alberta
Student Degree Start Date: 2002/9
Student Degree Received Date: 2007/8
Student Canadian Residency Status: Permanent Resident
Thesis/Project Title: Planetary magnetic fields in the solar system: A numerical study of dynamo models
Present Position: Assistant Professor, Universidad de los Andes, Colombia

Editorial Activities

2014/5 - 2016/5 Content Creator and Editor, Frontiers in Earth Science, Journal

Organizational Review Activities

- 2009-01-01 - Advisory Panel Member, Canadian Space Agency
 2009-05-29 Member of Planetary Geology & Geophysics Study Group. Helped draft an extended report of potential strategies to "advance the field of planetary sciences (which includes, but is not limited to: planetary geology, geophysics, geochemistry and astrobiology) in Canada".

International Collaboration Activities

- 2012-07-01 CollaboratorCanada
 Collaborative work with Michael "Ted" Evans, emeritus professor specializing in paleomagnetism at University of Alberta. Dynamo models used to constrain paleomagnetic observations.
- 2008-07-01 Collaborator, Colombia
 Ongoing Collaboration with former graduate student Natalia Gomez-Perez, now a professor at Universidad de los Andes. Development and simulation of and with the legacy dynamo code MAGIC (with J. Wicht at MPI in Katlenburg-Lindau, Germany). Applications to Earth and planetary dynamos, and coupling of Mercury dynamo to magnetosphere dynamics.
- 2005-07-01 Collaborator, United States
 Ongoing Collaboration with UCLA Spinlab (PI Jonathan Aurnou). Listed as Collaborator on two NASA grants: 1. "Libration Induced Fluid Dynamics of Planetary Cores and Sub-surface Oceans."; 2. "Modeling Zonal Wind Generation on the Jovian Planets."
- 2003-07-01 Collaborator, Germany
 Ongoing Collaboration with Johannes Wicht of the Max Planck Institute for Solar System Research. Development and simulation of and with the legacy planetary dynamo numerical code MAGIC. Applications include Earth and Mercury dynamos, deep zonal winds of the giant planets, and dynamos of the giant planets, including Jupiter, Saturn, Uranus and Neptune.

Presentations

1. Dynamics of Giant Planets: Bands, Spots, and Dynamos. Royal Astronomical Society of Canada invited speaker, Edmonton, Canada
 Main Audience: General Public
 Invited?: Yes, Keynote?: Yes
2. (2015). Vortices and Zonal Flow in a Model of Jupiter With Shallow Stable Stratification and Deep Convection. Stellar and Planetary Dynamos, Göttingen, Germany
 Main Audience: Researcher
 Invited?: Yes
3. (2013). Zonal flow and Vortices From Numerical Models of Deep Convection in Giant Planets. Bromery Lecture, Department of Earth and Planetary Sciences, Baltimore, United States
 Main Audience: Researcher
 Invited?: Yes, Keynote?: No
4. (2013). Boussinesq and Anelastic Numerical Models of Rotating Convection with Applications to Giant Planets. Connecting Theory to Experiments in Geophysical and Astrophysical Fluid Dynamics workshop. Hosted by the Institute for Planets and Exoplanets (iPLEX) at UCLA., Los Angeles, United States
 Main Audience: Researcher
 Invited?: Yes, Keynote?: Yes

5. (2013). Zonal flow structure in Boussinesq and anelastic numerical models of rotating convection. Visit to Max Planck Institute (MPI) for Solar System Research., Katlenburg-Lindau, Germany
Main Audience: Researcher
Invited?: Yes, Keynote?: No
6. (2013). Zonal flow structure in Boussinesq and anelastic numerical models of rotating convection. EGU General Assembly, Vienna, Austria
Main Audience: Researcher
Invited?: No, Keynote?: No
7. Gomez-Perez, Natalia. (2012). Boundary layer control on magnetohydrodynamic numerical simulations. AGU Fall meeting, San Francisco, United States
Main Audience: Researcher
Invited?: No, Keynote?: No
8. (2012). Models of the geodynamo over geologic time and the inclination test of the GAD hypothesis. American Geophysical Union (AGU) Fall meeting, San Francisco, United States
Main Audience: Researcher
Invited?: Yes, Keynote?: No
9. (2012). The inclination test of the geomagnetic field: Insights from numerical dynamo models. EGU General Assembly, Vienna, Austria
Main Audience: Researcher
Invited?: No, Keynote?: No
10. (2012). The structure of deeply seated high latitude jets in numerical models of giant planets. EGU General Assembly, Vienna, Austria
Invited?: No, Keynote?: No
11. (2010). The dynamical structure of giant planets. AGU Fall meeting, San Francisco, United States
Main Audience: Researcher
Invited?: No, Keynote?: No
12. (2009). Numerical models of zonal flow and dynamo action in Jupiter and Saturn. AGU Fall Meeting, San Francisco, United States
Main Audience: Researcher
Invited?: No, Keynote?: No
13. (2009). Modelling the effect of radially variable conductivity on dynamo action and zonal flow in the Giant planets. Institute of Space Science, Exploration and Technology (ISSET) annual symposium, Edmonton, Canada
Main Audience: General Public
Invited?: Yes, Keynote?: No
14. (2009). A Dynamical Tour of Planetary Interiors. Royal Astronomical Society of Canada (RASC) Satrfest, Black Nugget Lake, Canada
Main Audience: General Public
Invited?: Yes, Keynote?: Yes
15. (2009). Modelling the effect of radially variable conductivity on dynamo action and zonal flow in the Giant planets. AGU/CGU Joint Assembly, Toronto, Canada
Main Audience: Researcher
Invited?: No, Keynote?: No
16. (2008). A dynamical tour of the giant planets. Bromery Lecture, Johns Hopkins University, Baltimore, United States
Main Audience: Researcher
Invited?: Yes, Keynote?: Yes
17. (2008). Rotation, Convection, and a Diversity of Dynamos in Numerical Models and Planetary Interiors. Study of the Earth's Deep Interior (SEDI) meeting, Kunming, China
Main Audience: Researcher
Invited?: Yes, Keynote?: No

18. (2008). Numerical dynamo and global MHD models of Mercury's core and magnetosphere with applications to the MESSENGER mission. COSPAR Scientific Assembly, Montreal, Canada
Main Audience: Researcher
Invited?: No, Keynote?: No
19. (2008). Numerical models of planetary magnetic fields: Is Mercury a special case?. Carnegie Institution, Department of Terrestrial Magnetism Colloquium, Washington DC, United States
Main Audience: Researcher
Invited?: Yes, Keynote?: Yes

Publications

Journal Articles

1. Heimpel, M, Gastine, T, Wicht, J. (2015). Simulation of deep-seated zonal jets and shallow vortices in gas giant atmospheres. *Nature Geoscience*.
First Listed Author
In Press,
Refereed?: Yes
Number of Contributors: 3

Funding Sources: Compute Canada
2. Gastine T, Wicht J, Duarte L, Heimpel M, Becker A. (2014). Explaining Jupiter's magnetic field and equatorial jet dynamics. *Geophysical Research Letters*. 41: 1-10.
Co-Author
Published,
Refereed?: Yes
Number of Contributors: 4
3. Gastine T, Heimpel M, Wicht J. (2014). Zonal flow scaling in rapidly-rotating compressible convection. *Earth & Planetary Science Letters*. 232: 36-50.
Co-Author
Published,
Refereed?: Yes
Number of Contributors: 3
4. Heimpel H, Evans M. (2013). Testing the geomagnetic dipole and reversing dynamo models over Earth's cooling history. *Physics of the Earth and Planetary Interiors*. 224: 124-131.
First Listed Author
Published,
Refereed?: Yes, Open Access?: No
Number of Contributors: 2
5. Soderlund K, Heimpel M, King E, Aurnou J. (2013). Turbulent models of ice giant internal dynamics: Dynamos, heat transfer, and zonal flows. *Icarus*. 224: 97-113.
Published,
Refereed?: Yes
6. Heimpel M, Aurnou J. (2012). Convective bursts and the coupling of Saturn's equatorial storms and interior rotation. *The Astrophysical Journal*. 746(51): 1-14.
Published,
Refereed?: Yes
7. Heimpel M, *Gomez-Perez N. (2011). On the relationship between zonal jets and dynamo action in giant planets. *Geophysical Research Letters*. 38(L14201): 1-6.
Published,
Refereed?: Yes

8. *Gomez-Perez N, Heimpel M, Wicht J. (2010). Effects of a radially varying electrical conductivity on 3d numerical dynamos. *Physics of the Earth and Planetary Interiors*. 181: 42-53.
Published,
Refereed?: Yes
9. Heimpel M, Kabin K. (2008). Mercury Redux. *Nature Geoscience*. 1(9): 564-566.
Published,
Refereed?: Yes
10. Aurnou J, Heimpel M, Allen L, King E, Wicht J. (2008). Convective heat transfer and the pattern of thermal emission on the gas giants. *Geophysical Journal International*. 173(3): 793-801.
Published,
Refereed?: Yes
11. Kabin K, Heimpel M, Rankin R, Aurnou J, *Gomez-Perez N, Paral J, Gombosi T, Zurbuchen T, Koehn P, DeZeeuw D. (2008). Global MHD modeling of Mercury's magnetosphere with applications to the MESSENGER mission and dynamo theory. *Icarus*. 195(1): 1-15.
Published,
Refereed?: Yes

Supervised Student Publications

1. Christian Escalante
High-Resolution Imaging of the Mantle Transition Zone beneath Japan from Sparse Receiver Functions. (2012). ,
Student Contribution (%): 100
Masters Thesis in Geophysics, Department of Physics, University of Alberta