

# James A Hedberg

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## Education

McGill University, Montreal, QC, Canada

PhD, Physics, 2011

- ▶ Thesis Topic: Ultra-Low Temperature Atomic Force Microscopy
- ▶ Advisor: Professor Guillaume Gervais
- ▶ Area of Study: Condensed Matter Experimental Physics

Portland State University, Portland, OR, USA

MS, Physics, 2005

- ▶ Thesis Topic: Carbon Nanotubes as Electronic Components
- ▶ Advisor: Professor Jun Jiao
- ▶ Area of Study: Mesoscopic Physics – Biophysics

St. John's College, Santa Fe, NM, USA

BA, Liberal Arts, 2000

- ▶ Thesis Topic: J.S. Bach's Goldberg Variations

## Professional Positions

The City College of New York, Department of Physics

*Lecturer (Doctoral)*

*Fall 2013 to present*

- ▶ Instructor of Record for introductory and advanced UG physics courses
- ▶ Director, CCNY Planetarium

McGill University, Montreal, QC, Canada

*Course Lecturer*

*Fall 2012 to Summer 2013*

- ▶ Taught introductory physics and math to undergraduate students and engineers.  
*Instructor of Record for:*
  - Introduction to Physics 1 & 2 (Algebra Based Physics)
  - Physics 1 & 2 (Calculus Physics for Engineers)
  - Linear Algebra
- ▶ Developed activities for the McGill - Macdonald Campus Active Learning Lab
- ▶ Advised Students

*Post-Doctoral Researcher*

*2011 to 2013*

- ▶ Performed fundamental physics experiments on Graphene in the quantum Hall regime

*Graduate Researcher*

*2005 to 2010*

- ▶ Designed and constructed a state of the art low-temperature physics laboratory
- ▶ Developed new methods for visualization of force microscopy data sets
- ▶ Supervised undergraduate research assistants

Courses include: Advanced Experimental Methods, First Year Electricity and Magnetism, Third Year Mechanics and Electromagnetic Waves.

- ▶ Managed/Coordinated a new, upper level Experimental Methods course
- ▶ Development of new interactive media for class time demonstration of physics concepts
- ▶ Led discussions regarding course material, marked assignments and prepared solutions
- ▶ Wrote a series of Historical Asides in Physics to accompany the course materials

*Physics Education Consultant, Media Developer  
WOW Labs*

*August 2007 to 2013*

- ▶ Designed, developed, and produced multimedia to accompany education materials for Canadian K-12 physical science programs
- ▶ Managed and served as consultant for undergraduate assistants of the program

University of Texas – DMiller Studios, Portland, OR, USA

*Course Developer*

*June to August 2005*

- ▶ Wrote and developed an online, interactive physics course covering the fundamentals of undergraduate physics, from Classical Mechanics to Modern Physics

Portland State University, Portland, OR, USA

*Research Assistant*

*August 2003 to May 2005*

- ▶ Developed new nanoscale technologies in a collaborative project between the University and the Intel Corporation

Colorado State University, Fort Collins, CO, USA

*Instructor – Continuing Education Center*

*Winter 2001*

- ▶ Taught Classical Music Fundamentals to Community Members

St. John's College, Santa Fe, NM, USA

*Teaching Assistant*

*August 1998 to June 2000*

Assistant for the Sophomore Music Program

- ▶ Led classroom discussions and lectured on Western music theory and analysis
- ▶ Ensured a technical competence in the language of music theory
- ▶ Taught individual piano lessons

## **Awards & Fellowships & External Appointments**

Visiting Scientist, American Museum of Natural History, Astrophysics, 2019

MetroCITI Fellow, The Teacher College at Columbia University 2015-2016,

James E. Griffith Award For Material Science, McGill University, 2005

Research Experience for Undergraduates, Portland State University, 2003

Walter S. Baird Prize for an Original Composition: *Theme and Variations on Beethoven's Eroica Symphony, for piano*, St. John's College, 2000

## Grants Awarded

CUNY GRTI: Science Visualization in the CCNY Planetarium  
2017 Tech Fee: Upgrade to the CCNY Planetarium  
2016 Tech Fee: Install wired data ports to UG physics labs  
CUNY Advance 2015. "Homegrown Science Sims"  
PSC-CUNY Enhanced. "Homebuilt physics modules" ; 7/2014 - 6/2015

## Service and Other

### *Campus-wide*

CCNY [President's Task Force](#) on the Future of City College, Student Services Sub-committee (2018)  
Faculty Senate Committee on Online/Hybrid Education (2015-2016, Chair)  
Physical Plant Committee of the Faculty Senate (2018-Present)  
President's Online/Hybrid Education Collective (2014)  
Science Learning and Public Engagement Major Advisory Board Member  
Campus Engagement Network Member (2018)

### *Divisional*

Division of Science Safety Committee  
Scholarship Committee (2015)

### *Department*

Physics Major Advisor  
Curriculum Committee (2013-present)  
Uniformization committee (2013)  
UG Lab Committee (2013-present)  
Rewrote and Upgraded the entire introductory physics labs

### *External*

APS-Conference for Undergraduate Women in Physics at NYC (APS CUWIP-NYC) 2018, Local Organizing committee member  
Mentor for High School Students Summer Coding Bootcamp, 2015

## Interests

History of Science (Physics and Astronomy)  
Science Visualization  
Art and Science Intersection  
Science Outreach and Public Engagement

## Publications

Hedberg, James, [DIY Science Sims](#) (2018). CUNY Academic Works.

Xin Zhou, J. Hedberg, Y. Miyahara, P. Grutter and K. Ishibashi, [Scanning gate imaging of two coupled quantum dots in single-walled carbon nanotubes](#), Nanotechnology 25 495703 (2014)

J.A. Hedberg, A. Lal, Y. Miyahara, P. Grütter, G. Gervais, M. Hilke, L. Pfeiffer, and K.W. West, [Low Temperature Electrostatic Force Microscopy of a Deep Two Dimensional Electron Gas using a Quartz Tuning Fork](#), Applied Physics Letters, **97**, 143107 (2010)

J.A. Hedberg, [The Most Imperfect Mirror](#), Le Panoptique, July 2008

J.A. Hedberg, L. Dong, J. Jiao, [Air Flow Technique for large scale dispersion and alignment of carbon nanotubes on various substrates](#), Applied Physics Letters, **86**, 143111, 2005

G.L. Rorrer, C.H. Chang, S.H. Liu, C. Jeffries, J. Jiao, J.A. Hedberg, *Biosynthesis of Silicon-Germanium Oxide Nanocomposites by the Marine Diatom Nitzschia frustulum*, Journal of Nanoscience and Nanotechnology, **5**, 1, 2005

## Conference Proceedings and Presentations

[If You Planet, They Will Come: Reviving the CCNY Planetarium](#), Schwab, Ellianna; DiTomaso, Victoria; Hedberg, James, American Astronomical Society, AAS Meeting #229, id.335.10, January 2017

APS March Meeting - 2012, [Scanning gate microscopy on graphene in the quantum Hall regime](#), James Hedberg, Y. Miyahara, M. Hilke, G. Gervais, P. Grütter, J. Renard, J. Folk

APS March Meeting - 2010, [Low Temperature Scanning Force Microscopy for Probing the Edge of Quantum Hall Systems](#), J.A. Hedberg, A. Lal, Y. Miyahara, G. Gervais, P. Grutter, M. Hilke, L.N. Pfeiffer, K.W. West

Non-Contact AFM – 2008, *Ultra-Low Temperature, High Magnetic Field AFM: Design and Operation*, J.A. Hedberg, V. Sazonova, Y. Miyahara, C. da Cunha, G. Gervais, M Hilke, R. Bennewitz, P. Grütter

International Conference on Nanoscience and Technology – 2008, *Ultra-Low Temperature, High Magnetic Field AFM: Design and Operation*, J.A. Hedberg, V. Sazonova, Y. Miyahara, C. da Cunha, G. Gervais, M Hilke, R. Bennewitz, P. Grütter

Canadian Microscopical Society – 2008, 35<sup>th</sup> Annual Meeting, *Ultra-Low Temperature, High Magnetic Field AFM: Design and Operation*, J.A. Hedberg, V. Sazonova, C. da Cunha, G. Gervais, M Hilke, R. Bennewitz, P. Grütter

J. Jiao, L.F. Dong, V. Chirayos, J. Bush, J.A. Hedberg, *Methods of Dispersion and Alignment of Single-Walled Carbon Nanotubes and Effects on Their Structural and Electric Properties*, Symposium G: Special Issue in International Journal of Nanoscience, **5** (2006)

J.A. Hedberg, J. Jiao, V. Dubin, J. Dominguez, and R. Chebiam, *Morphology and Field Emission Characteristics of Carbon Nanotubes Grown using Pt Catalysts*, Microscopy and Microanalysis: Proceeding of the Electron Microscopy and Microanalysis 2004, **10**, Supplement 2, 394-395 (2004)

## Other

[“Field Visualizer AR”](#) (Augmented Reality Educational App), James Hedberg (2018)

[ScienceSims.com](http://ScienceSims.com)