

Adina Luican-Mayer, PhD

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WORK EXPERIENCE AND EDUCATION

University of Ottawa, Department of Physics, Ottawa, Canada <i>Assistant Professor</i>	2016 – present
Argonne National Laboratory, Center for Nanoscale Materials, Lemont, IL <i>Alexei Abrikosov Distinguished Postdoctoral Fellowship</i>	2012 – 2015
Rutgers – The State University of New Jersey, New Brunswick, NJ <i>PhD in Physics</i>	2006 – 2012
Jacobs University Bremen, Bremen, Germany <i>Bachelor of Science – major in Physics</i>	2003 – 2006

HONORS AND AWARDS

- Richard J. Plano Dissertation Prize 2013
- Alexei Abrikosov Postdoctoral Fellowship at Argonne National Laboratory 2012 – 2015
- Alcatel-Lucent fellowship for PhD studies in Condensed Matter Physics 2007 – 2012
- APS Division of Materials Physics Iris Ovshinsky Student Travel Award 2010
- Scholarship from Hamburg University for attending Nanoscience Summer School 2009
- President’s List for academic achievements at Jacobs University Bremen 2005 – 2006
- Prizes at National Romanian Physics Olympiads 1999 – 2003

PUBLICATIONS (Google Scholar h-index 15; >3800 citations)

Journal Articles:

1. Alzate N. and Luican-Mayer A. Functionalized graphene surfaces for selective gas sensing, *under review (2020)*
2. Plumadore R., Baskurt M., Boddison-Chouinard M., Lopinski G., Modaresi M., Potasz P., Hawrylak P., Sahin H., Peeters F.M., Luican-Mayer A. Prevalence of oxygen defects in an in-plane anisotropic transition metal dichalcogenide, *under review (2020)*
3. Plumadore R., Al Ezzi M., Adam S., Luican-Mayer A. Moiré patterns in graphene - rhenium disulfide vertical heterostructures, *accepted Journal of Applied Physics (2020)*
4. Rautela R., Scarfe S., Guay J.-M., Lazar P., Pykal M., Azimi S., Grenapin C., Boddison-Chouinard J., Halpin A., Wang W., Andrzejewski L., Plumadore R., Park J., Menard J.-M., Otyepka M., Luican-Mayer A. Mechanistic insight into the limiting factors of graphene-based environmental sensors, **ACS Applied Materials & Interfaces (2020)**

5. Boddison-Chouinard J., Scarfe S., Watanabe K., Taniguchi T., Luican-Mayer A. Flattening van der Waals heterostructure interfaces by local thermal treatment. *Appl. Phys. Lett.* 115, 231603 (2019)
6. Luican-Mayer A., Zhang Y., DiLullo A., Li Y., Fisher B., Ulloa S.E., Hla S.-W. Negative Differential Resistance Observed on the Charge Density Wave of a Transition Metal Dichalcogenide. *Nanoscale* 11, 22351-22358 (2019)
7. Ramos S.L.L.M., Plumadore R., Boddison-Chouinard J., Hla S.-W., Guest J.R., Gosztola D., Pimenta M.A., Luican-Mayer A. Suppression of the commensurate charge density wave phase in ultrathin 1T-TaS₂ evidenced by Raman hyperspectral analysis. *Phys. Rev. B* 100, 165414 (2019)
8. Stecher K., Huang S.H.-Y., Escorcio R., Luican-Mayer A. Demonstrating the concepts of sheet resistance, field effect, and mobility of a semiconductor using graphene field effect transistors. *European Journal of Physics* 40, 065501 (2019)
9. Luican-Mayer, A. A needle in a moiré stack. *Nature Physics* 15, 1107–1108 (2019)
10. Boddison-Chouinard, J., Plumadore, R., Luican-Mayer, A. Fabricating van der Waals Heterostructures with Precise Rotational Alignment. *J. Vis. Exp.* 149, e59727 (2019)
11. Wu S., Luican-Mayer A., Bhattacharya A. Nanoscale Measurement of Nernst Effect in Two-dimensional Charge Density Wave Material 1T-TaS₂. *Appl. Phys. Lett.* 111, 223109 (2017)
12. Luican-Mayer A., Li G., Andrei E.Y. Atomic scale characterization of mismatched graphene layers. *J. Electron Spectrosc. Relat. Phenom.* 219, 92–98 (2017)
13. Luican-Mayer A., Barrios-Vargas J.E., Falkenberg J.T., Autès G., Cummings A.W., Soriano D., Li G., Brandbyge M., Yazyev O.V., Roche S., Andrei E.Y. Localized electronic states at grain boundaries on the surface of graphene and graphite. *2D Mater.* 3, 031005 (2016)
14. Lu C.-P., Rodriguez-Vega M., Li G., Luican-Mayer A., Watanabe K., Taniguchi T., Rossi E., Andrei E. Local, global, and nonlinear screening in twisted double-layer graphene. *PNAS* 113, 6623–6628 (2016)
15. Thoutam L.R., Wang Y.L., Xiao Z.L., Das S., Luican-Mayer A., Divan R., Crabtree G.W., Kwok W.K. Temperature-dependent three-dimensional anisotropy of the magnetoresistance in WTe₂, *Phys. Rev. Lett.* 115, 046602 (2015)
16. Wang Y.L., Thoutam L.R., Xiao Z.L., Hu J., Das S., Mao Z.Q., Wei J., Divan R., Luican-Mayer A., Crabtree G.W., Kwok W.K. Origin of the turn-on temperature behavior in WTe₂. *Phys. Rev. B* 92, 180402(R) (2015)
17. Luican-Mayer A., Kharitonov M., Li G., Lu C.-P., Skachko I., Goncalves A.M., Watanabe K., Taniguchi T., Andrei E.Y. Screening Charged Impurities and Lifting the Orbital Degeneracy in

Graphene by Populating Landau Levels. *Phys. Rev. Lett.* 112, 036804 (2014) - *Editor's suggestion*

18. Li G., Luican-Mayer A., Abanin D., Levitov L., Andrei E.Y. Evolution of Landau levels into edge states in graphene. *Nature Communications* 4, 1744 (2013)
19. Luican A., Li G., Reina A., Kong J., Nair R., Novoselov K.S., Geim A.K., Andrei E.Y. Single-Layer Behavior and its Breakdown in Twisted Graphene Layers. *Phys. Rev. Lett.* 106, 126802 (2011)
20. Luican A., Li G., Andrei E.Y. Quantized Landau level spectrum and its density dependence in graphene. *Phys. Rev. B* 83, 041405(R) (2011) - *Editor's suggestion*
21. Li G., Luican A., Andrei E.Y. Self-navigation of a Scanning Tunneling Microscope tip toward a micron-size graphene sample. *Rev. Sci. Instruments* 82, 073701 (2011)
22. Skachko I., Du X., Duerr F., Luican A., Abanin D.A., Levitov L.S., Andrei E.Y. Fractional quantum Hall effect in suspended graphene probed with two-terminal measurements. *Phil. Trans. R. Soc. A* 368, 5403–5416 (2010)
23. Luican A., Li G., Andrei E.Y. Scanning Tunneling Microscopy and spectroscopy of graphene on layers on graphite. *Solid State Commun.* 149, 27–28 (2009)
24. Li G., Luican A., dos Santos J.M.B.L, Castro Neto A.H., Reina A., Kong J., Andrei E.Y. Observation of Van Hove singularities in twisted graphene layers. *Nature Physics* 6, 109–113 (2009)
25. Li G., Luican A., Andrei E.Y. Scanning tunneling spectroscopy of graphene on graphite. *Phys. Rev. Lett.* 102, 176804 (2009)
26. Li G., Luican A., Andrei E.Y. Electronic states on the surface of graphite. *Physica B* 404, 2673–2677 (2009)
27. Du X., Skachko I., Duerr F., Luican A., Andrei E.Y. Fractional quantum Hall effect and insulating phase of Dirac electrons in graphene. *Nature* 462, 192–195 (2009)
28. Temirov R., Soubatch S., Luican A., Tautz F.S. Free-electron like dispersion in an organic monolayer film on a metal substrate. *Nature* 444, 350–353 (2006)

Book Chapter:

- Adina Luican-Mayer and Eva Y. Andrei, **Scanning Tunneling Microscopy and Spectroscopy studies of graphene**, in “Physics of Graphene”, editors H. Aoki and M. S. Dresselhaus, Nanoscience and Technology Series Springer p. 28 (2014)

PRESENTATIONS

Invited

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|---|--------------------------|---------------|
| 1. ENGE 2020 | Jeju, Korea | Nov. 2020 |
| 2. Electronic Crystals ECRYS-2020 COVID19 postponed to 2022 | Corsica, France | August 2020 |
| 3. Canadian Assoc. Physicists Annual Congress COVID19 cancelled | Ontario, Canada | June 2020 |
| 4. 237 th Electrochemical Society Meeting COVID19 cancelled | Montreal, Canada | May 2020 |
| 5. Loyola University, <i>Colloquium</i> | Chicago, USA | Oct. 2019 |
| 6. Clarkson University, <i>Colloquium</i> | New York, USA | Sept. 2019 |
| 7. The Regroupement Québécois sur les Matériaux de Pointe | Quebec, Canada | July 2019 |
| 8. Telluride Science Research Center, 2D Materials workshop | Telluride, USA | June 2019 |
| 9. Aspen Center for Physics, Moiré Materials workshop | Aspen, USA | June 2019 |
| 10. Canadian Society of Chemistry | Quebec, Canada | June 2019 |
| 11. CIFAR Summer School | British Columbia, Canada | April 2019 |
| 12. University of Waterloo, <i>Quantum Institute Colloquium</i> | Ontario, Canada | April 2019 |
| 13. Carleton University, <i>Colloquium</i> | Ontario, Canada | April 2019 |
| 14. Lehigh University, <i>Colloquium</i> | Pennsylvania, USA | February 2019 |
| 15. 2018 Schawlow-Townes <i>Symposium</i> | Ottawa, Canada | October 2018 |
| 16. New Materials <i>Symposium</i> | Hangzhou, China | June 2018 |
| 17. Canadian Ass. of Physicists lecture Université de Sherbrooke | Quebec, Canada | January 2017 |
| 18. Canadian Ass. of Physicists lecture Bishop's University | Quebec, Canada | January 2017 |
| 19. Canadian Ass. of Physicists lecture Laurentian University | Ontario, Canada | February 2017 |
| 20. Canadian Ass. of Physicists lecture Lakehead University | Ontario, Canada | March 2017 |
| 21. Canadian Ass. of Physicists lecture University of Manitoba | Manitoba, Canada | April 2017 |
| 22. Canadian Ass. of Physicists lecture Brandon University | Manitoba, Canada | April 2017 |
| 23. SCiMAN2016 <i>Symposium</i> | San Jose, Costa Rica | December 2016 |
| 24. American Vacuum Society 63rd Symposium & Exhibition | Nashville, USA | Nov. 2016 |
| 25. Concordia University, <i>Colloquium</i> | Montreal, Canada | October 2016 |
| 26. Centre for Nanoscale Materials, Argonne, DOE Review | Argonne, USA | June 2016 |
| 27. Canadian Association of Physicists | Ottawa, Canada | June 2016 |
| 28. National Research Council, <i>Steacie Colloquium</i> | Ottawa, Canada | May 2016 |
| 29. SUNY Binghamton University, <i>Colloquium</i> | Binghamton, USA | April 2016 |
| 30. Drexel University, <i>Colloquium</i> | Philadelphia, USA | Nov. 2015 |
| 31. University of Notre Dame, <i>Seminar</i> | Notre Dame, USA | Sept. 2015 |
| 32. Northwestern University, <i>Colloquium</i> | Chicago, USA | March 2015 |
| 33. UC Riverside, <i>Seminar</i> | Riverside, USA | March 2015 |
| 34. Queens College CUNY, <i>Colloquium</i> | NYC, USA | February 2015 |
| 35. University of Wisconsin-Madison, <i>Colloquium</i> | Madison, USA | February 2015 |
| 36. IUPUI, <i>Colloquium</i> | Indianapolis, USA | February 2015 |
| 37. Iowa State University, <i>Colloquium</i> | Ames, USA | February 2015 |
| 38. CUNY, <i>Colloquium</i> | NYC, USA | February 2015 |
| 39. UC Merced, <i>Colloquium</i> | Merced, USA | February 2015 |
| 40. University of New Hampshire, <i>Colloquium</i> | Durham, USA | January 2015 |
| 41. University of Ottawa, <i>Colloquium</i> | Ottawa, Canada | January 2015 |
| 42. University of Washington, <i>Colloquium</i> | Seattle, USA | Nov. 2014 |
| 43. Rutgers University, <i>Colloquium</i> | Piscataway, USA | Nov. 2014 |
| 44. UC Berkeley, <i>Seminar</i> | Berkeley, USA | August 2014 |
| 45. Experimental Techniques and Physics in Graphene Research | Bogota, Columbia | August 2014 |
| 46. NSS8 Workshop on Nanotechnology | Chicago, USA | July 2014 |
| 47. Northern Illinois University, <i>Colloquium</i> | DeKalb, USA | April 2014 |

48. University of Central Florida, <i>Seminar</i>	Orlando, USA	February 2014
49. University of California San Diego, <i>Seminar</i>	San Diego, USA	Nov. 2013
50. International Winterschool on Electronic Properties	Kirchberg, Austria	March, 2013
51. APS March Meeting	Baltimore, USA	March, 2013
52. Instituto de Ciencia de Materiales, <i>Seminar</i>	Madrid, Spain	Sept. 2012
53. European Material Research Society Fall Meeting	Warsaw, Poland	Sept. 2012
54. Center for Nanoscale Materials, <i>Colloquium</i>	Argonne, USA	January 2012
55. University of Aachen, <i>Seminar</i>	Aachen, Germany	January 2012
56. University of Delft, <i>Seminar</i>	Delft, Netherlands	January 2012
57. Gotham-Metro Condensed Matter Meeting	New York, USA	April 2010

Contributed

- European Materials Research Society Spring Meeting May 2015
- APS March Meeting March 2018, 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2008
- AVS Prairie Chapter Symposium September 2014
- Symposium Laboratory of Surface Modification March 2011
- AVS Symposium October 2019

TEACHING

New courses developed

- PHY 8191 Low-dimensional Material Systems Winter 2016
- PHY 2300 How Things Work / Physics of Everyday Life Fall 2018
- PHY 8191 Graduate Seminar in Materials Summer 2020

Standard courses

- PHY 1122 Fundamentals of Physics II (150-200 engineering, physics) Winter 2017, 2018, 2019, 2020
- PHY 3370 Introductory Quantum Mechanics Fall 2019
- PHY 3770 Introduction à la mécanique quantique Fall 2020

STUDENT SUPERVISION

Current

- **4 postdoctoral fellows**
- **6 graduate students**
- **7 undergraduate students** – including Honors projects, UROP fellowships, COOP
- **1 engineer**

Graduated

- **1 postdoctoral fellow**
- **3 graduate students**
- **>20 undergraduate students** – including international exchange, COOP, Honors projects

AWARDED FUNDING**Internal**

- uOttawa Start-up fund
- Office of the Vice-President, Research (OVPR) Visiting Researcher Program (VRP) 2018

External

- DND IDEaS - Phase 1a “*Graphene-based multi modal adaptable thermal camouflage*”; 160,000 CAD, PI
- DND IDEaS - Phase 1b “*Sensitive detection and identification of airborne chemicals and biological agents*” (Spring 2020- Spring 2021); 800,000 CAD, Co-PI
- DND IDEaS - Phase 1a “*Sensitive detection and identification of airborne chemicals and biological agents*” (January 2019 – July 2019); 200,000 CAD; Co-PI
- NSERC SPG-P “*Quantum circuits in 2D materials*” (2018–2021); ~300,000 CAD yearly; Co-PI
- NSERC Discovery “*Custom low-dimensional materials explored from atom to bulk*” (April 2016 – April 2021); 24,000 CAD yearly; PI
- NSERC Engage “*Development of flexible environmental sensors based on ultrathin 2D materials*” (March 2018 – November 2018); 25,000 CAD, PI
- Canada Foundation of Innovation and Ontario Research – instrumentation grant – “*UHV LT Scanning Tunnelling Microscope*” (February 2018); PI

SERVICE**University service**

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| • Equity, Diversity, and Inclusion Committee | 2020 – |
| • Physics Undergraduate Program Review Committee | 2020 – |
| • Faculty Canada Research Chair Search Committee | 2019 |
| • Physics Department Chair Search Committee | 2019 |
| • Physics Colloquium Committee | 2016 – 2017 |
| • Faculty Curriculum Committee | 2018 – |
| • Physics Department Curriculum Committee | 2018 – |
| • Physics Department Outreach Committee | 2019 – |
| • Thesis chair and evaluator for MSc. and PhD | 2016 – |

Professional service

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| • Co-organizer “QC2DM” Workshop Ottawa | 2019-2020 |
| • Member of the AVS Nanometer-Scale Science and Technology Division board | 2019-2021 |
| • Program Committee International Conference on Nanoscience and Technology (ICN+T) | 2020 |
| • Program Committee 2D Materials Focus Topic (2D FT) AVS 67th Symposium | 2020 |
| • Evaluator M.Sc./M.Sc.A. in Nanoscience and Nanotechnology at Concordia University | 2019 |
| • Paper reviewer for <i>Science</i> , <i>Nature Physics</i> , <i>Physical Reviews Letters</i> , <i>Nature Communications</i> , <i>ACS Nano</i> , <i>Nano Letters</i> , <i>Solid State Communications</i> , <i>Science Advances</i> , <i>Soft Materials</i> , <i>Applied Physics Letters</i> | |
| • Organizing Committee, Canadian Association of Physicists Congress | 2016 |

OUTREACH

- Soapbox Science Ottawa - **COVID19 postponed** 2020
- Pint of Science public talk - **COVID19 postponed** 2020
- Cool Science Saturday/ Canada Science and Technology Museum 2020
- CBC Radio “The Element of Surprise” – Neon 2019
- Canadian Undergraduate Women in Physics conference – panelist 2019
- Ontario University Fair 2018, 2019
- Outreach talk to finalists of Canada science fair 2018
- Canadian Association of Physicists lecture tour 2017
- Colloquium and Eureka Lecture Coordinator, Department of Physics, uOttawa 2016
- Experimental demos at “Nanodays” at Longfellow Elementary School, Wheaton, IL 2015
- Keynote speaker at Naperville Central High School workshop for girls in STEM fields 2013