

CONTACT INFORMATION	Apt. 1301, 160 Chapel street K1N 8P5, Ottawa, ON, Canada +1 (343) 998-7808	email: yael.birenbaum@nrc-cnrc.gc.ca orcID: 0000-0002-6177-8946 citizenship: Canadian & French Languages: Fully bilingual English & French
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RESEARCH INTERESTS Atomistic simulations of material physics: machine learning, DFT, Monte Carlo, crystallography, STEM. Jacob's Ladder. Ionic defects and transport in functional layered and hybrid materials. Multiferroics.

SCIENTIFIC POSITIONS	National Research Council, Canada <i>Postdoctoral Fellow</i> Quantum Theory group, Security & Disruptive Technologies Advisor: Prof. I. Tamblyn	2018 – Present
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Oak Ridge National Laboratory, USA <i>Postdoctoral Researcher</i> Material Science & Technology Division, Physical Science Directorate Advisors: Dr. A. Y. Borisevich (Scanning Transmission Electron Microscopy) Dr. V. R. Cooper (Materials Theory)	2016 – 2018
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Massachusetts Institute of Technology <i>Visiting Scientist (unaffiliated)</i> Mechanical Engineering Prof. A. Kolpak Group	2015 – 2016
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EDUCATION	ETH Zürich, Switzerland <i>PhD Computational Theoretical Material Physics</i> Advisors: Prof. C. Ederer & Prof. N. A. Spaldin Thesis: Can the Aurivillius phases be multiferroic? An <i>ab-initio</i> study	2012 – 2015
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Trinity College Dublin, Ireland <i>PhD Computational Theoretical Material Physics under Prof. C. Ederer</i> Work continued at ETH, following supervisor's move	2010 – 2012
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Imperial College London, UK <i>MSc DIC Quantum Fields & Fundamental Forces</i> Advisor: Dr. A. Rajantie Thesis: The Ising model as a first step towards quantum field theory/condensed matter theory duality	2008 – 2010
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King's College London, UK <i>BSc Physics (Upper Second Class Honors)</i> Supervisors: Prof. M. Sakellariadou & Dr. W. Nelson Thesis: Classical and quantum mechanical properties of black holes	2005 – 2008
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AWARDS	National Research Council of Canada Postdoctoral Fellowship Lesbians Who Tech Leadership Summit	2018 2018
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	Oak Ridge National Laboratory Special Performance Award (2 years in a row)		2017-2018
	AT Kearney Falling Walls Scholar		2013
	Trinity College Dublin Postgraduate Research Studentship		2010-12
PROPOSAL	Oak Ridge Leadership Computing Facility: Director's Discretion		2017
	3 million hours on TITAN (CPU/GPU hybrid supercomputer)		
TEACHING EXPERIENCE	Project Supervisor for Masters & Final Year Bachelor students, ETH Zurich		
	J. van den Broek: <i>Origin of Ferroelectricity in 2-Layered Aurivillius</i>		2014
	N. Fanelli & R. Hömberger: <i>Ferroelectricity in Strained Aurivillius $Bi_5FeTi_3O_{15}$</i>		2013
	Certificate	Learning to Teach for English speaking Teaching Assistant	ETH 2013
	Teaching	Solid State Physics & Chemistry of Materials (MSc)	ETH 2014
		Mathematics for Junior Freshman (1 st y.)	TCD 2011
	Lab Demonstrator	Computational Techniques for Material Science (2 nd y.)	ETH 2012-13
		Physics for Junior Freshman (1 st y.)	TCD 2011
SYNERGISTIC ACTIVITIES	Co-Organizer: Materials Theory Journal Club & Seminar Series		2017 – 2018
	Received ORNL Supplementary Performance Award for it (see above)		
	Advocacy for diversity in STEM		2018
	Raised funds, organized, and spoke at multiple events, advised directors & diversity officers on the specific challenges and solutions for women & queer scientists		
	Co-Organizer: Special Graduate Symposium at DPG March Meeting		Nov – Mar 2013
	Selected topic, invited speakers, raised 1'000 Euros, coordinated with DPG/jDPG		
	<i>Topological Defects in Magnetic Materials: From Devices to Cosmos</i>		
	Intern: French Space Agency (Centre National d'Etudes Spatiales)		Jun – Aug 2007
	Literature review of 5 years of accumulated scientific data from ESA's satellite INTEGRAL, online bilingual report to specialized and general audiences.		
	Intern: Italian Space Agency (Alenia Spazio), Paris, France		Jun 2002
	Administration for business in the satellite industry. Visit of Ariespace and Paris Observatory.		
SCIENTIFIC SKILLS	Deep Learning	Machine & deep learning, specializing in deep learning for scientific applications	
	Microscopy	Certified operator of ORNL's NION UltraSTEM 200 Electron Microscope	
	DFT	Decade experience with atomistic <i>ab-initio</i> calculations and modelling	
	Monte Carlo	Adapted Metropolis code to perform study of magnetism of the Aurivillius family	
	Crystallography	Space groups and other mathematical tools	
	Programming	linux & HPC, Python, C, C++, MATLAB, Mathematica	

PUBLICATIONS
(GOOGLE
SCHOLAR)

submitted	[Proceeding] <i>Tracing Oxygen Transport Pathways with In-Situ STEM and Theory</i> A. Y. Birenbaum , V. R. Cooper, A. Borisevich, <i>Microsc. Microanal.</i> TBD (2019)
	<i>Intrinsic interfacial van der Waals monolayers and their effect on the high-temperature superconductor FeSe / SrTiO₃</i> , H. Sims, D. N. Leonard, A. Y. Birenbaum , Z. Ge, L. Li, V. R. Cooper, M. F. Christholm, S. Pantelides, under review at <i>Phys. Rev. Lett.</i> (arXiv)
2018	<i>Oxygen vacancy formation energies in PbTiO₃/SrTiO₃ superlattice</i> , L. Zhand, I. Bredeson, A. Y. Birenbaum , P. R. C. Kent, V. R. Cooper, P. Ganesh, H. Xu, <i>Phys. Rev. Materials</i> 2 , 064409 (2018)
	[Proceeding] <i>Towards the mechanism of oxygen vacancy formation & ordering via tracking of beam-induced dynamics and density functional theory</i> , A. Y. Birenbaum , L. Qiao, V. R. Cooper, A. Borisevich, <i>Microsc. Microanal.</i> 24 , S1, 92-93 (2018)
	[Proceeding] <i>Accurate calculations of CBED patterns for 4D STEM using electron densities calculated by density functional theory</i> , M. P. Oxley, A. Y. Birenbaum , T. Pandey, V. R. Cooper, M. Chi, <i>Microsc. Microanal.</i> 24 , S1, 116-117 (2018)
2017	[Proceeding] <i>Investigating ionic transport anisotropy in oxygen deficient lanthanum cobaltites via first principles theory</i> , A. Y. Birenbaum , L. Qiao, M. Biegalski, V. R. Cooper, A. Borisevich <i>Microsc. & Microanal.</i> 23 , S1, 1410-1411 (2017)
	<i>Magnetic critical temperatures in magnetically dilute 4-layered Aurivillius phases</i> A. Y. Birenbaum , A. Scaramucci, C. Ederer, <i>Phys. Rev. B</i> 95 , 104419 (2017) (cited 8 times)
2016	<i>Controlling the cation distribution & electric polarization with epitaxial strain in Aurivillius phase Bi₅FeTi₃O₁₅</i> , A. Y. Birenbaum , C. Ederer, <i>Appl. Phys. Lett.</i> 108 , 082903 (2016) (cited 5 times)
2014	<i>The potentially multiferroic Aurivillius phase: electric Bi₅FeTi₃O₁₅: cation site preference, electric polarization, and magnetic coupling from first principles</i> , A. Y. Birenbaum , C. Ederer, <i>Phys. Rev. B</i> 90 , 214109, (2014) (cited 57 times)
TALKS	Invited
2019	Computational Materials North, NRC, Ottawa, ON, Canada
	<i>Designing macroscale properties in oxides, one atom at a time</i>
	Annual Workshop, Center for Simulational Physics, UGA, GA, USA <i>Why structure is everything to oxygen transport</i>
	Machine Learning division, Sargent group, University of Toronto, ON, Canada <i>Designing macroscale properties in oxides, one atom at a time</i>
2016	Condensed Matter Seminar series, Vanderbilt University, Nashville, TN, USA
	<i>Can the Aurivillius phases be multiferroic?</i>

2015 **MicroNano Seminar series, Mechanical Engineering, MIT, Cambridge, MA, USA**
Can the Aurivillius phases be multiferroic?

2014 **Topical meeting: Aurivillius Day, University of Liège, Belgium**
Multiferroic Aurivillius phases: the case of $Bi_5FeTi_3O_{15}$ by ab initio & Co.

2013 **Young innovators section of TED-style conference, Falling Walls Lab, Berlin**
Breaking the wall of computation with multiferroics

2007 **Maxwell Lecture, King's College London, UK**
*INTEGRAL over the gamma sky: INTERNATIONAL Gamma Ray Astrophysics Laboratory
 5 years in orbit*

Contributed at international conferences

2018 **APS March Meeting, Los Angeles, CA, USA**
Oxygen vacancy transport at Y_2O_3/CeO_2 interfaces: insights from density functional theory

2017 **APS March Meeting, New Orleans, LA, USA**
"Striped" lanthanum cobaltites films: how strain can order oxygen defects

2015 **DPG March Meeting, Technical University of Berlin, Germany**
Can the Aurivillius phases be multiferroic?
Fundamental Physics of Ferroelectrics and related materials
Ab Initio analysis of ferroelectric and magnetic properties of potentially multiferroic Aurivillius phases

2014 **APS March Meeting, Denver, USA**
Multiferroic Aurivillius phases: the case of $Bi_5FeTi_3O_{15}$ by ab initio

2013 **IMPRS/SFB Workshop on Nano-science & -tech, Max-Planck, Halle/Salle, Germany**
Multiferroic Aurivillius phases: the case of $Bi_5FeTi_3O_{15}$ by ab initio
DPG March Meeting, University of Regensburg, Germany
Multiferroic Aurivillius phases: the case of $Bi_5FeTi_3O_{15}$ by ab initio

POSTERS

2017 **Fundamentals of Ferroelectrics, Williamsburg, VA, USA**
Electronic Structure Workshop, Princeton, NJ, USA
Oak Ridge Postgraduate Association Symposium, ORNL, TN, USA

2014 **Swiss Physical Society Annual Meeting, University of Fribourg, Switzerland**
Platform for Advanced Scientific Computing, ETH Zurich, Switzerland

2013 **Platform for Advanced Scientific Computing Junior Retreat, Boldern, Switzerland**
MRC Graduate Symposium, ETH Zurich, Switzerland
European School on Magnetism – Magnetism for Energy, Corsica, France

2012 **MRC Graduate Symposium, ETH Zurich, Switzerland**

2011 **DFT & Beyond Hands-On, Fritz-Haber Institute, Max Plank, Berlin, Germany**

- WORKSHOPS**
- 2019 **Physics & AI**, McGill, Montreal QC, Canada
 - 2013 **Understanding Electronic & Magnetic Correlations**, MaNEP, Saas-Fee, Switzerland
 - 2012 **ABINIT Hands-On CECAM Workshop**, ETH Zurich, Switzerland
 - European School on Multiferroics**, Ascona, Switzerland
 - 2011 **International Tables of Crystallography Workshop**, Bilbao, Spain
 - 2009 **British Uni. Summer School in Theoretical Elementary Particle Phys.**, Liverpool, UK
 - 2006 **UK Cosmology**, King's College London, UK
- OUTREACH**
- 2019 Co-organizer of Pint of Science, Ottawa, Canada
 - 2018 ORCS Girls: teach middle school girls to code, Oak Ridge, TN, USA
 - 2017 ORNL's travelling Science Fair trailer, Secret City Festival, TN, USA
 - 2016 ORNL's travelling Science Fair trailer, Morgan County Career Fair, TN, USA
 - 2013 *What do Electrons, LEGO & computers have in common?* Science Slam, Switzerland
 - 2010 *Dualities: Towards Greater Unification in Physics*, Talk at Imperial College London, UK
 - 2007 Introduction to Astrophysics, class aged 6–7, EABJM International School, Paris, France
 - 2006-07 Lab demonstrator at Science Fair, Royal Holloway, London, UK
- PROFESSIONAL SOCIETY MEMBERSHIPS**
- American Physical Society
 - National Postdoctoral Association
 - Women in High Performance Computing
 - National Organization of Gay and Lesbian Scientists and Technical Professionals Inc.
 - (past) Deutsche Physikalische Gesellschaft (German Physical Society)
 - (past) Institute of Physics (UK Physical Society)
- HOBBIES**
- Outside of science and advocacy, I have a great interest in art, with a particular passion for installations photography and interactive media. Collaborations with Julie H. Birenbaum lead to exhibitions in Paris and Zurich. I also enjoy unwinding while skiing, horseback riding, or climbing.
- REFERENCES**
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| Prof. Isaac Tamblyn | Dr. Valentino Cooper | Dr. Albina Borisevich |
| Security & Disruptive Technologies | Materials Theory | Electron Microscopy (STEM) |
| National Research Council | Oak Ridge National Laboratory | Oak Ridge National Laboratory |
| <i>100 Sussex Drive</i> | <i>PO BOX 2008 - MS6114</i> | <i>PO BOX 2008</i> |
| <i>K1N 5A2, Ottawa, ON, Canada</i> | <i>37831, Oak Ridge, TN, USA</i> | <i>37831, Oak Ridge, TN, USA</i> |
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