

# COREY OSES

Materials Science, Duke University

Personal Information · Education · Press and News Releases · Honors and Awards ·  
Talks/Presentations · Journal Publications · Book Publications · Teaching Experience ·  
Work Experience · Certifications

## PERSONAL INFORMATION

email [corey.oses@duke.edu](mailto:corey.oses@duke.edu)  
phone (W) +1 (919) 684 1553  
website [coreyoses.com](http://coreyoses.com)

## EDUCATION

**Ph.D.** 2013–2018 Duke University  
**GPA:** 3.8/4.0 · **Department:** Mechanical Engineering and Materials Science  
**Thesis:** *Machine learning, phase stability, and disorder with the Automatic Flow Framework for Materials Discovery*  
**ProQuest:** [link](#)  
**Advisor:** Stefano Curtarolo

**B.Sc.** 2009–2013 Cornell University  
**Department:** Applied and Engineering Physics  
**Thesis:** *Plume Propagation Simulation for Pulsed Laser Deposition*  
**Advisor:** Joel Brock

## PRESS AND NEWS RELEASES

Duke University  
Pratt School of  
Engineering November 2018 “Disordered Materials Could Be Hardest, Most Heat-Tolerant Ever”  
• This press release is featured on [AAAS EurekAlert!](#), [Phys.org](#), [ScienceDaily](#), [Science Bulletin](#), [Naaju, NewsBeezer](#), [RemoNews](#), [Tech2](#), and [LongRoom News](#).  
[pratt.duke.edu/about/news/chaotic-carbides](http://pratt.duke.edu/about/news/chaotic-carbides)

MRS Bulletin August 2017 “Universal fragment descriptor predicts materials properties”  
[cambridge.org/core/journals/mrs-bulletin/news/universal-fragment-descriptor-predicts-materials-properties](http://cambridge.org/core/journals/mrs-bulletin/news/universal-fragment-descriptor-predicts-materials-properties)

UNC Eshelman  
School of Pharmacy June 2017 “Breakthrough Tool Predicts Properties of Theoretical Materials, Finds New Uses for Current Ones”  
• This press release is featured on [AAAS EurekAlert!](#), [Phys.org](#), and [ScienceDaily](#).  
[pharmacy.unc.edu/news/2017/06/06/breakthrough-tool-predicts-properties-theoretical-materials-finds-new-uses-current-ones/](http://pharmacy.unc.edu/news/2017/06/06/breakthrough-tool-predicts-properties-theoretical-materials-finds-new-uses-current-ones/)

Duke University  
Pratt School of  
Engineering April 2017 “Computers Create Recipe for Two New Magnetic Materials”  
• This press release is featured on [Phys.org](#), [Slashdot](#), [Hacker News](#), [Reddit](#), [Engadget](#), [Engineering.com](#), [Science Alert](#), [Azo Materials](#), [Next Big Future](#), [Futurism](#), [New Atlas](#), and [International Business Times](#).  
[pratt.duke.edu/about/news/predicting-magnets](http://pratt.duke.edu/about/news/predicting-magnets)

MRS Bulletin April 2015 “Materials fingerprints identified for informatics”  
[doi.org/10.1557/mrs.2015.76](https://doi.org/10.1557/mrs.2015.76)

Computational  
Chemistry  
Highlights January 2015 “Materials Cartography: Representing and Mining Materials Space Using Structural and Electronic Fingerprints”  
• “This paper is a [tour de force](#) for computational materials science” — Prof. Alán Aspuru-Guzik, Harvard University.  
[compchemhighlights.org/2015/01/materials-cartography-representing-and.html](http://compchemhighlights.org/2015/01/materials-cartography-representing-and.html)

Duke University  
Research January 2015 “Molecular Tornado”  
[research.duke.edu/molecular-tornado](http://research.duke.edu/molecular-tornado)

Duke University  
Graduate School October 2014 “Competing for NSF Fellowships: Advice from a Current Fellow”  
[gradschool.duke.edu/professional-development/blog/competing-nsf-fellowships-advice-current-fellow](http://gradschool.duke.edu/professional-development/blog/competing-nsf-fellowships-advice-current-fellow)

ERN Conference February 2013 “2013 Oral and Poster Presentation Award Winners”  
2013 [new.emerging-researchers.org/2013-oral-and-poster-presentation-winners](http://new.emerging-researchers.org/2013-oral-and-poster-presentation-winners)

## HONORS AND AWARDS

<i>Publication Award</i>	2018	Editor’s Choice, <b>Publication in Comput. Mater. Sci.</b> , Elsevier
<i>Publication Award</i>	2017	Editor’s Choice, <b>Publication in Comput. Mater. Sci.</b> , Elsevier
<i>Award</i>	August 14, 2015	<b>Best Teaching Assistant Award (ME 221)</b> , Duke University Department of Mechanical Engineering and Materials Science
<i>Publication Award</i>	2015	Editor’s Choice, <b>Publication in Comput. Mater. Sci.</b> , Elsevier
<i>Publication Award</i>	2015	Editor’s Choice, <b>Publication in Chem. Mater.</b> , American Chemical Society
<i>Fellowship</i>	2013–2016	Graduate Research Fellowship, National Science Foundation
<i>Award</i>	August 22, 2013	<b>Best Presentation Award at the MEMS Departmental Retreat</b> , Duke University Department of Mechanical Engineering and Materials Science
<i>Award</i>	March 02, 2013	<b>First Place in Nanoscience and Physics Research Presentation</b> , NSF / AAAS / EHR Emerging Researchers National Conference
<i>Scholarship</i>	2011–2013	Shell Incentive Fund Scholarship
<i>Scholarship</i>	2010 & 2011	Xerox Corporation Scholarship
<i>Scholarship</i>	2010 & 2011	Intel Academic Award
<i>Grant</i>	June 18, 2010	Cornell University Unmanned Air Systems Team awarded \$1,000 grant, AUVSI Student Unmanned Aerial Systems Competition
<i>Scholarship</i>	2009–2013	Meinig Family Cornell National Scholars

## TALKS / PRESENTATIONS

<i>Invited Seminar</i>	2019	<p><b>AFLOW: Integrated infrastructure for computational materials discovery</b></p> <p><b>Co-Presenters:</b> Cormac Toher, David Hicks, Eric Gossett, Marco Esters, Max J. Brenner &amp; Stefano Curtarolo</p> <p><b>Invited seminar</b> at the University of Pennsylvania AFLOW Full-Day Workshop, Philadelphia, Pennsylvania — May 03, 2019.</p> <p><b>Invited seminar</b> at the North Carolina State University AFLOW Full-Day Workshop, Raleigh, North Carolina — March 12, 2019.</p> <p><b>Invited seminar</b> at the Carnegie Mellon University AFLOW Full-Day Workshop, Pittsburgh, Pennsylvania — January 21, 2019.</p> <p><b>Invited seminar</b> at the NIST/Moore Foundation/University of Maryland Machine Learning for Materials Research Bootcamp 2018 &amp; Workshop on Machine Learning Quantum Materials, Institute for Bioscience &amp; Biotechnology Research in Gaithersburg, Maryland — August 02, 2018.</p>
<i>Contributed Talk</i>	2019	<p><b>Cloud-oriented computational phase diagrams with AFLOW-CHULL</b></p> <p><b>Contributed talk</b> at the American Physical Society March Meeting, Boston, Massachusetts — March 07, 2019.</p> <p><b>Poster presentation</b> at the CECAM (Centre Européen de Calcul Atomique et Moléculaire) Open Databases Integration for Materials Design (OPTiMaDe) Workshop, Lausanne, Switzerland — June 11, 2018.</p>
<i>Invited Talk</i>	2019	<p><b>Going Off-Stoichiometry: Challenging Traditional Materials Discovery</b></p> <p>Naval Research Laboratory Center for Computational Materials Science Seminar, Washington, D.C. — January 09, 2019.</p>
<i>Contributed Talk</i>	2018	<p><b>Universal Fragment Descriptors for Predicting Properties of Inorganic Crystals</b></p> <p><b>Contributed talk</b> at the International Association for Computational Mechanics (IACM) 13<sup>th</sup> World Congress in Computational Mechanics (WCCM), New York City, New York — July 23, 2018.</p> <p><b>Contributed talk</b> at the Hopkins Extreme Materials Institute Mach Conference, Annapolis, Maryland — April 05, 2018.</p> <p><b>Contributed talk</b> at the Duke University Chemistry Department Third Annual Graduate Research Symposium, Durham, North Carolina — October 09, 2017.</p> <p><b>Contributed talk</b> at the American Physical Society March Meeting, New Orleans, Louisiana — March 14, 2017.</p>

- Invited Talk* 2018 Advancements in Materials Informatics with AFLOW  
**Invited talk** at the Fritz-Haber-Institut der Max-Planck-Gesellschaft Theory Department Seminar, Berlin, Germany — January 18, 2018.  
**Invited talk** at the Humboldt University of Berlin Physics Department Seminar, Berlin, Germany — January 16, 2018.
- Contributed Talk* 2016 Modeling Off-Stoichiometric Materials with a High-Throughput, *Ab-Initio* Approach  
**Contributed talk** at the American Physical Society March Meeting, Baltimore, Maryland — March 16, 2016.
- Invited Talk* 2016 Materials Cartography: Representing and Mining Materials Space using Structural and Electronic Fingerprints  
**Invited talk** at the Brigham Young University Condensed Matter Physics Seminar, Provo, Utah — February 18, 2016.  
**Contributed talk** at the Duke Mechanical Engineering and Materials Science (MEMS) Department Graduate Student Seminar, Durham, North Carolina — September 25, 2015.  
**Contributed talk** at the American Physical Society March Meeting, San Antonio, Texas — March 02, 2015.
- Contributed Talk* 2015 Plume Propagation Simulation for Pulsed Laser Deposition  
**Poster presentation** at the University of Texas at Austin Machine Learning Summer School (MLSS), Austin, Texas — January 12, 2015.  
**Contributed talk** at the NSF / AAAS / EHR Emerging Researchers National Conference, Washington, D.C. — February 22, 2014.  
**Poster presentation** at the MRS / ASM / AVS / AReMS Meeting, North Carolina State University, Raleigh, North Carolina — November 15, 2013.  
**Poster presentation** at the Duke Mechanical Engineering and Materials Science (MEMS) Department Annual Retreat, Durham, North Carolina — August 22, 2013.  
• [Best Presentation Award](#)
- Contributed Talk* 2013 Synchrotron Radiation Focusing Optics — Capillary Beam Stop Design  
**Contributed talk** at the NSF / AAAS / EHR Emerging Researchers National Conference, Washington, D.C. — March 02, 2013.  
• [First Place in Nanoscience and Physics Research Presentation](#)  
**Poster presentation** at the Cornell University Chapter of LSAMP Research Symposium, Ithaca, New York — August 07, 2012.

## JOURNAL PUBLICATIONS

2019

- Submitted* 21 *Metallic glasses for biodegradable implants*  
**Authors:** Denise C. Ford, David Hicks, [Corey Oses](#), Cormac Toher & Stefano Curtarolo  
**arXiv:** [arxiv:1902.00485](#)
- Submitted* 20 *Predicting Superhard Materials via a Machine Learning Informed Evolutionary Structure Search*  
**Authors:** Patrick Avery, Xiaoyu Wang, Eva Zurek, Davide M. Proserpio, Cormac Toher, [Corey Oses](#), Eric Gossett & Stefano Curtarolo
- NPJ Computational Materials* 19 *Unavoidable disorder and entropy in multi-component systems*  
NPJ Comput. Mater. **in press** (2019)  
**Authors:** Cormac Toher, [Corey Oses](#), David Hicks & Stefano Curtarolo  
**arXiv:** [arxiv:1906.01085](#)
- Physical Review Materials* 18 *AFLOW-QHA3P: Robust and automated method to compute thermodynamic properties of solids*  
Phys. Rev. Mater. **in press** (2019)  
**Authors:** Pinku Nath, Demet Usanmaz, David Hicks, [Corey Oses](#), Marco Fornari, Marco Buongiorno Nardelli, Cormac Toher & Stefano Curtarolo  
**arXiv:** [arxiv:1807.04669](#)

- NPJ Computational Materials 17 *Coordination corrected ab initio formation enthalpies*  
NPJ Comput. Mater. 5(59) (2019)  
**Authors:** Rico Friedrich, Demet Usanmaz, [Corey Oses](#), Andrew R. Supka, Marco Fornari, Marco Buongiorno Nardelli, Cormac Toher & Stefano Curtarolo  
**DOI:** [10.1038/s41524-019-0192-1](#)
- 2018
- Journal of Chemical Information and Modeling 16 *AFLOW-CHULL: Cloud-oriented platform for autonomous phase stability analysis*  
J. Chem. Inf. Model. 58(12), 2477–2490 (2018)  
**Authors:** [Corey Oses](#), Eric Gossett, David Hicks, Frisco Rose, Michael J. Mehl, Eric Perim, Ichiro Takeuchi, Stefano Sanvito, Matthias Scheffler, Yoav Lederer, Ohad Levy, Cormac Toher & Stefano Curtarolo  
**DOI:** [10.1021/acs.jcim.8b00393](#)
- MRS Bulletin 15 *Data-driven design of inorganic materials with the Automatic Flow Framework for Materials Discovery*  
MRS Bull. 43(9), 670–675 (2018)  
**Authors:** [Corey Oses](#), Cormac Toher & Stefano Curtarolo  
**DOI:** [10.1557/mrs.2018.207](#)
- Nature Communications 14 *Novel high-entropy high-hardness metal carbides discovered by entropy descriptors*  
Nat. Commun. 9, 4980 (2018)  
**Authors:** Pranab Sarker<sup>†</sup>, Tyler Harrington<sup>†</sup>, Cormac Toher, [Corey Oses](#), Mojtaba Samiee, Jon-Paul Maria, Donald W. Brenner, Kenneth S. Vecchio & Stefano Curtarolo  
<sup>†</sup> contributed equally  
**DOI:** [10.1038/s41467-018-07160-7](#)
- NPJ Computational Materials 13 *Machine learning modeling of superconducting critical temperature*  
NPJ Comput. Mater. 4(29) (2018)  
**Authors:** Valentin Stanev, [Corey Oses](#), Aaron Gilad Kusne, Efrain Rodriguez, Johnpierre Paglione, Stefano Curtarolo & Ichiro Takeuchi  
**DOI:** [10.1038/s41524-018-0085-8](#)
- Computational Materials Science 12 *AFLOW-ML: A RESTful API for machine-learning prediction of materials properties*  
Comput. Mater. Sci. 152, 134–145 (2018)  
**Authors:** Eric Gossett, Cormac Toher, [Corey Oses](#), Olexandr Isayev, Fleur Legrain, Frisco Rose, Eva Zurek, Jesús Carrete, Natalio Mingo, Alexander Tropsha & Stefano Curtarolo  
• This paper was selected for [Editor's Choice](#).  
**DOI:** [10.1016/j.commatsci.2018.03.075](#)
- Acta Crystallographica Section A 11 *AFLOW-SYM: platform for the complete, automatic and self-consistent symmetry analysis of crystals*  
Acta Cryst. A 74, 184–203 (2018)  
**Authors:** David Hicks, [Corey Oses](#), Eric Gossett, Geena Gomez, Richard H. Taylor, Cormac Toher, Michael J. Mehl, Ohad Levy & Stefano Curtarolo  
**DOI:** [10.1107/S2053273318003066](#)
- 2017
- Inorganic Chemistry 10 *The structure and composition statistics of 6A binary and ternary structures*  
Inorg. Chem. 57(2), 653–667 (2017)  
**Authors:** Alon Hever, [Corey Oses](#), Stefano Curtarolo, Ohad Levy & Amir Natan  
**DOI:** [10.1021/acs.inorgchem.7b02462](#)
- Computational Materials Science 9 *AFLUX: The LUX materials search API for the AFLOW data repositories*  
Comput. Mater. Sci. 137, 362–370 (2017)  
**Authors:** Frisco Rose, Cormac Toher, Eric Gossett, [Corey Oses](#), Marco Buongiorno Nardelli, Marco Fornari & Stefano Curtarolo  
• This paper was selected for [Editor's Choice](#).  
**DOI:** [10.1016/j.commatsci.2017.04.036](#)

- Nature Communications 8 *Universal Fragment Descriptors for Predicting Properties of Inorganic Crystals*  
Nat. Commun. **8**, 15679 (2017)  
**Authors:** Olexandr Isayev<sup>†</sup>, [Corey Oses](#)<sup>†</sup>, Cormac Toher, Eric Gossett, Stefano Curtarolo & Alexander Tropsha  
<sup>†</sup> contributed equally  
**DOI:** [10.1038/ncomms15679](#)
- Physical Review Materials 7 *Combining the AFLOW GIBBS and elastic Libraries to efficiently and robustly screening thermomechanical properties of solids*  
Phys. Rev. Mater. **1**, 015401 (2017)  
**Authors:** Cormac Toher, [Corey Oses](#), Jose J. Plata, David Hicks, Frisco Rose, Ohad Levy, Maarten de Jong, Mark Asta, Marco Fornari, Marco Buongiorno Nardelli & Stefano Curtarolo  
**DOI:** [10.1103/PhysRevMaterials.1.015401](#)
- Acta Materialia 6 *A Computational High-Throughput Search for New Ternary Superalloys*  
Acta Mater. **122**, 438–447 (2017)  
**Authors:** Chandramouli Nyshadham, [Corey Oses](#), Jacob E. Hansen, Ichiro Takeuchi, Stefano Curtarolo & Gus L. W. Hart  
**DOI:** [10.1016/j.actamat.2016.09.017](#)
- Science Advances 5 *Accelerated Discovery of New Magnets in the Heusler Alloy Family*  
Sci. Adv. **3**(4), e1602241 (2017)  
**Authors:** Stefano Sanvito, [Corey Oses](#), Junkai Xue, Anurag Tiwari, Mario Žic, Thomas Archer, Pelin Tozman, Munuswamy Venkatesan, J. Michael D. Coey & Stefano Curtarolo  
**DOI:** [10.1126/sciadv.1602241](#)
- 2016
- Physical Review X 4 *High-Throughput Computation of Thermal Conductivity of High-Temperature Solid Phases: The Case of Oxide and Fluoride Perovskites*  
Phys. Rev. X **6**(4), 041061 (2016)  
**Authors:** Ambroise van Roekeghem, Jesús Carrete, [Corey Oses](#), Stefano Curtarolo & Natalio Mingo  
**DOI:** [10.1103/PhysRevX.6.041061](#)
- Chemistry of Materials 3 *Modeling Off-Stoichiometry Materials with a High-Throughput Ab-Initio Approach*  
Chem. Mater. **28**(18), 6484–6492 (2016)  
**Authors:** Kesong Yang, [Corey Oses](#) & Stefano Curtarolo  
**DOI:** [10.1021/acs.chemmater.6b01449](#)
- 2015
- Computational Materials Science 2 *The AFLOW Standard for High-Throughput Materials Science Calculations*  
Comput. Mater. Sci. **108A**, 233–238 (2015)  
**Authors:** Camilo E. Calderon, Jose J. Plata, Cormac Toher, [Corey Oses](#), Ohad Levy, Marco Fornari, Amir Natan, Michael J. Mehl, Gus L. W. Hart, Marco Buongiorno Nardelli & Stefano Curtarolo  
• This paper was selected for [Editor’s Choice](#).  
**DOI:** [10.1016/j.commatsci.2015.07.019](#)
- Chemistry of Materials 1 *Materials Cartography: Representing and Mining Materials Space Using Structural and Electronic Fingerprints*  
Chem. Mater. **27**(3), 735–743 (2015)  
**Authors:** Olexandr Isayev, Denis Fourches, Eugene N. Muratov, [Corey Oses](#), Kevin M. Rasch, Alexander Tropsha & Stefano Curtarolo  
• This paper was selected for [Editor’s Choice](#).  
**DOI:** [10.1021/cm503507h](#)

## BOOK PUBLICATIONS

2019

- Book Chapter 3 *Automated computation of materials properties, Materials Informatics: Methods, Tools and Applications, in press*  
**Authors:** Cormac Toher, [Corey Oses](#) & Stefano Curtarolo  
**arXiv:** [arxiv:1805.05309](#)

2018

- Book Chapter* 2 Machine learning and high-throughput approaches to magnetism, *Handbook of Materials Modeling. Volume 2 Applications: Current and Emerging Materials*  
**Authors:** Stefano Sanvito, Mario Žic, James Nelson, Thomas Archer, [Corey Oses](#) & Stefano Curtarolo  
**DOI:** [10.1007/978-3-319-50257-1\\_108-1](#)
- Book Chapter* 1 The AFLOW Fleet for Materials Discovery, *Handbook of Materials Modeling. Volume 1 Methods: Theory and Modeling*  
**Authors:** Cormac Toher, [Corey Oses](#), David Hicks, Eric Gossett, Frisco Rose, Pinku Nath, Demet Usanmaz, Denise C. Ford, Eric Perim, Camilo E. Calderon, Jose J. Plata, Yoav Lederer, Michal Jahnátek, Wahyu Setyawan, Shidong Wang, Junkai Xue, Kevin M. Rasch, Roman V. Chepulskii, Richard H. Taylor, Geena Gomez, Harvey Shi, Andrew R. Supka, Rabih Al Rahal Al Orabi, Priya Gopal, Frank T. Cerasoli, Laalitha Liyanage, Haihang Wang, Ilaria Siloi, Luis A. Agapito, Chandramouli Nyshadham, Gus L. W. Hart, Jesús Carrete, Fleur Legrain, Natalio Mingo, Eva Zurek, Olexandr Isayev, Alexander Tropsha, Stefano Sanvito, Robert M. Hanson, Ichiro Takeuchi, Michael J. Mehl, Aleksey N. Kolmogorov, Kesong Yang, Pino D'Amico, Arrigo Calzolari, Marcio Costa, Riccardo De Gennaro, Marco Buongiorno Nardelli, Marco Fornari, Ohad Levy & Stefano Curtarolo  
**DOI:** [10.1007/978-3-319-42913-7\\_63-1](#)

#### TEACHING EXPERIENCE

- Teaching Assistant* Fall 2014–Spring 2015 ME 221: Structure and Properties of Solids, Duke University  
 Department of Mechanical Engineering and Materials Science  
 • [Best Teaching Assistant Award](#), August 14, 2015

#### WORK EXPERIENCE

- Postdoctoral Fellow* 2018–present Duke University  
**Supervisor:** Stefano Curtarolo
- Internship* Summer 2013 Cornell High Energy Synchrotron Source (BioSAXS on F2 and G Beamlines)  
**Supervisors:** Richard E. Gillilan & Ernest Fontes
- Internship* Summer 2012 Cornell High Energy Synchrotron Source (Capillary Optics Group)  
**Supervisors:** Rong Huang & Ernest Fontes
- Office Assistant* Summer 2011 ILR Budget Office, Cornell University  
**Supervisor:** Renee Monroe Cook

#### CERTIFICATIONS

- Participant* June 11–14, 2019 CECAM (Centre Européen de Calcul Atomique et Moléculaire)  
 Open Databases Integration for Materials Design (OPTiMaDe)  
 Workshop at the École polytechnique fédérale de Lausanne (EPFL)
- Graduate* June 25–29, 2018 Machine Learning Summer School (MLSS) at Duke University
- Participant* June 11–15, 2018 CECAM (Centre Européen de Calcul Atomique et Moléculaire)  
 Open Databases Integration for Materials Design (OPTiMaDe)  
 Workshop at the École polytechnique fédérale de Lausanne (EPFL)
- Graduate* January 7–16, 2015 Machine Learning Summer School (MLSS) at the University of Texas at Austin
- Graduate* May 22–27, 2011 *The LeaderShape Institute* at Cornell University
- Technician License* July 29, 2010 American Radio Relay League (ARRL) in Roselle, New Jersey