COREY OSES

Materials Science, Duke University

PERSONAL INFORMATION

email	corey.oses@duke.edu
phone	(W) +1 (919) 684 1553
website	coreyoses.com

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

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: search.proquest.com/docview/2172402640?pq-origsite=gscholar
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

MRS Bulletin — August 2017 — *"Universal fragment descriptor predicts materials properties"*
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/

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

MRS Bulletin — April 2015 — *"Materials fingerprints identified for informatics"*
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

Duke University Research	January 2015	*"Molecular Tornado"*
	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	
ERN Conference 2013	February 2013	*"2013 Oral and Poster Presentation Award Winners"*
	new.emerging-researchers.org/2013-oral-and-poster-presentation-winners	

HONORS AND AWARDS

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

TALKS / PRESENTATIONS

Invited Seminar 2019 AFLOW: Integrated infrastructure for computational materials discovery

Co-Presenters: Cormac Toher, David Hicks, Marco Esters, Eric Gossett, Max J. Brenner & Stefano Curtarolo
Invited seminar at the NIST/Moore Foundation/University of Maryland Machine Learning for Materials Research Bootcamp 2019 & Workshop on Machine Learning Quantum Materials, Institute for Bioscience & Biotechnology Research in Gaithersburg, Maryland — August 05, 2019.
Invited seminar at the University of Pennsylvania AFLOW Full-Day Workshop, Philadelphia, Pennsylvania — May 03, 2019.
Invited seminar at the North Carolina State University AFLOW Full-Day Workshop, Raleigh, North Carolina — March 12, 2019.
Invited seminar at the Carnegie Mellon University AFLOW Full-Day Workshop, Pittsburgh, Pennsylvania — January 21, 2019.
Invited seminar at the NIST/Moore Foundation/University of Maryland Machine Learning for Materials Research Bootcamp 2018 & Workshop on Machine Learning Quantum Materials, Institute for Bioscience & Biotechnology Research in Gaithersburg, Maryland — August 02, 2018.

Contributed Talk 2019 Cloud-oriented computational phase diagrams with AFLOW-CHULL

Contributed talk at the American Physical Society March Meeting, Boston, Massachusetts — March 07, 2019.
Poster presentation at the CECAM (Centre Européen de Calcul Atomique et Moléculaire) Open Databases Integration for Materials Design (OPTiMaDe) Workshop, Lausanne, Switzerland — June 11, 2018.

Invited Talk 2019 Going Off-Stoichiometry: Challenging Traditional Materials Discovery

Naval Research Laboratory Center for Computational Materials Science Seminar, Washington, D.C. — January 09, 2019.

Contributed Talk 2018 Universal Fragment Descriptors for Predicting Properties of Inorganic Crystals

Contributed talk at the International Association for Computational Mechanics (IACM) 13th World Congress in Computational Mechanics (WCCM), New York City, New York — July 23, 2018.
Contributed talk at the Hopkins Extreme Materials Institute Mach Conference, Annapolis, Maryland — April 05, 2018.
Contributed talk at the Duke University Chemistry Department Third Annual Graduate Research Symposium, Durham, North Carolina — October 09, 2017.
Contributed talk at the American Physical Society March Meeting, New Orleans, Louisiana — March 14, 2017.

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

Under Review 24 *Fermi energy engineering of enhanced toughness in high entropy carbides*

Authors: Tyler J. Harrington†, Corey Oses†, Cormac Toher, William M. Mellor, Kevin Kaufmann, Joshua Gild, Andrew Wright, Jian Luo, Stefano Curtarolo & Kenneth S. Vecchio
† contributed equally

Under Review

23 *Discovery of novel high-entropy ceramics via machine learning*

Authors: Kevin Kaufmann, Daniel Maryanovsky, William M. Mellor, Chaoyi Zhu, Alexander S. Rosengarten, Tyler J. Harrington, Corey Oses, Cormac Toher, Stefano Curtarolo & Kenneth S. Vecchio

Nature Reviews Materials

22 *High-entropy ceramics*
Nat. Rev. Mater. **in press** (2019)

Authors: Corey Oses, Cormac Toher & Stefano Curtarolo

Acta Materialia

21 *Metallic glasses for biodegradable implants*
Acta Mater. **176**, 297–305 (2019)

Authors: Denise C. Ford, David Hicks, Corey Oses, Cormac Toher & Stefano Curtarolo
DOI: 10.1016/j.actamat.2019.07.008

NPJ Computational Materials

20 *Predicting Superhard Materials via a Machine Learning Informed Evolutionary Structure Search*
NPJ Comput. Mater. **5**, 89 (2019)

Authors: Patrick Avery, Xiaoyu Wang, Corey Oses, Eric Gossett, Davide M. Proserpio, Cormac Toher, Stefano Curtarolo & Eva Zurek
DOI: 10.1038/s41524-019-0226-8

NPJ Computational Materials

19 *Unavoidable disorder and entropy in multi-component systems*
NPJ Comput. Mater. **5**, 69 (2019)

Authors: Cormac Toher, Corey Oses, David Hicks & Stefano Curtarolo
DOI: 10.1038/s41524-019-0206-z

NPJ Computational Materials

18 *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

Physical Review Materials

17 *AFLOW-QHA3P: Robust and automated method to compute thermodynamic properties of solids*
Phys. Rev. Mater. **3**, 073801 (2019)

Authors: Pinku Nath, Demet Usanmaz, David Hicks, Corey Oses, Marco Fornari, Marco Buongiorno Nardelli, Cormac Toher & Stefano Curtarolo
DOI: 10.1103/PhysRevMaterials.3.073801

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[†], Tyler J. Harrington[†], Cormac Toher, Corey Oses, Mojtaba Samiee, Jon-Paul Maria, Donald W. Brenner, Kenneth S. Vecchio & Stefano Curtarolo
[†] 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[†], Corey Oses[†], Cormac Toher, Eric Gossett, Stefano Curtarolo & Alexander Tropsha
[†] 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*

Authors: Cormac Toher, Corey Oses & Stefano Curtarolo
URL: wiley.com/en-us/Materials+Informatics%3A+Methods%2C+Tools%2C+and+Applications-p-9783527802272

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

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