Lyle M. Gordon

Department of Materials Science and Engineering
Northwestern University
2220 Campus Drive
Evanston, IL. 60208
USA

☎ office: 847-491-3584
✉: lyle@lylegordon.ca
URL: http://lylegordon.ca

Areas of Specialization

Atom probe tomography • Organic-inorganic interfaces • Biomineralization

Education

2008- **PhD Candidate in Materials Science and Engineering**
Northwestern University. Evanston, IL. Expected 2013
THESIS : Buried Organic-Inorganic Interfaces in Biological Minerals
ADVISOR : Dr. Derk Joester

2008 **BASc with Honours in Materials Science and Engineering**
University of Toronto, Toronto, ON.

Research Experience

2008- **Biomineral Engineering Group**, Materials Science and Engineering, Northwestern University.
ADVISOR : Dr. Derk Joester
Characterization of nanoscale buried organic-inorganic interfaces in biological minerals with atom-probe tomography.

2007-2008 **Hybrid Materials Group**, Materials Science and Engineering, University of Toronto.
ADVISOR : Dr. Glenn D. Hibbard
Developed and characterized a sub-millimetre scale periodic cellular material fabricated using rapid-prototyping and electrodeposition of high-strength nanocrystalline nickel.

2004-2008 **Concrete Canoe Team**, Civil Engineering, University of Toronto.
ADVISOR : Dr. Kim D. Pressnail
Coordinated the development, testing and implementation of a carbon fiber reinforced polymer modified lightweight aggregate concrete composite for use in the construction of a racing canoe.

2007 **Orthopaedic Biomechanics Lab**, Sunnybrook Health Sciences Centre.
ADVISOR : Dr. Cari M. Whyne.
Characterized the mechanical and biological properties of a elastin-hyaluronan composite hydrogel for tissue engineering of the nucleus pulposus.

2006 **Orthopaedic Biomechanics Lab**, Sunnybrook Health Sciences Centre.
ADVISOR : Dr. Cari M. Whyne.
Developed and validated a finite element model of pelvic lateral compression fracture stability.

2005 **Orthopaedic Biomechanics Lab**, Sunnybrook Health Sciences Centre.
ADVISOR : Dr. Cari M. Whyne.
Developed a 3D atlas-based method to automate segmentation of metastatic vertebrae on X-ray computed tomography scans.

Professional Experience

2012- **PreScouter**, Evanston, IL.
Technology Consultant
Led a consulting project to improve the texture of individually quick frozen vegetables with minimal process attributes for one of the largest private American food companies. Authored report outlining highest-potential technological and scientifical solutions to client and provided expert analysis.

Teaching

2012 **Biominerals: Hierarchical Architecture and Function**, Northwestern University.
Lecture on the structure and function of the chiton tooth.

2011 **Introduction to Materials Science**, Northwestern University.
Laboratory assistant.

2009 **Introduction to Materials Science**, Northwestern University.
Teaching and laboratory assistant.

2009 **Introduction to Materials Science**, Northwestern University.
Teaching and laboratory assistant.

Grants, Honours & Fellowships

2012-2013 **Terminal Year Fellowship**. McCormick School of Engineering, Northwestern University.

2010-2012 **Postgraduate Scholarship, Doctorate**. National Science and Engineering Research Council of Canada.

2009-2010 **Postgraduate Scholarship Extension, Masters**. National Science and Engineering Research Council of Canada.

2008-2009 **Appointed University Scholar**. The Graduate School, Northwestern University.

2008 **Walter P. Murphy Fellowship**. Department of Materials Science and Engineering, Northwestern University.

2008-2009 **Postgraduate Scholarship, Masters**. National Science and Engineering Research Council of Canada.

2008 **Alexander Graham Bell Canada Graduate Scholarship, Masters**. National Science and Engineering Research Council of Canada, *declined*.

2008 **Ontario Graduate Scholarship, Masters**. Ontario Graduate Scholarship Program, *declined*.

2008 **Stanford Graduate Fellowship**. Stanford University, *declined*.

2004-2008 **Dean's Honour List**. Faculty of Applied Science and Engineering, University of Toronto. *(4 years)*

2007-2008 **Stelco Scholarship**. Department of Materials Science and Engineering, University of Toronto.

2007 **Undergraduate Student Research Award**. National Science and Engineering Research Council of Canada.

2005-2007 **Scholarship**. Department of Materials Science and Engineering, University of Toronto. *(2 years)*

2006 **Undergraduate Student Research Award**. National Science and Engineering Research Council of Canada.

2005 **Research Summer Studentship Award**. Sunnybrook Health Science Centre.

2004 **Entrance Scholarship**. Department of Materials Science and Engineering, University of Toronto.

Publications & Presentations

Journal articles

Gordon, L.M., Joester, D. "Grain Boundary Chemistry Controls the Properties of Tooth Enamel." *in preparation*.

Gordon, L.M., Cohen, M.J. Joester, D. "Polymorph Selectivity and Stabilization in Chiton Tooth Ferrihydrite Biomineralization." *in preparation*.

Suram, S.K., Kaluskar, K., **Gordon, L.M.**, Joester, D., Rajan, K. "Extracting Crystallographic Information from Atom Probe Tomography of a Biomineral." *in preparation*.

2012 **Gordon, L.M.**, Tran, L., Joester, D. "Atom Probe Tomography of Apatites and Bone-Type Mineralized Tissues." *ACS Nano* 6, 10667-10675 (2012). [DOI]

2011 **Gordon, L.M.**, Joester, D. "Nano-Scale Chemical Tomography of Buried Organic-Inorganic Interfaces in the Chiton Tooth." *Nature* 469, 194-197 (2011). [DOI] Featured in *Nature Methods* 8, 199 (2011). [DOI]

2011 Moss, I., **Gordon, L.M.**, Woodhouse, K.A., Whyne, C.M., Yee, A.J.M. "A Novel Thiol-Modified-Hyaluronan and Elastin-Like Polypetide Composite Material for Tissue Engineering of the Nucleus Pulposus of the Intervertebral Disc." *Spine* 36, 1022-1029 (2011). [DOI]

2009 **Gordon, L.M.**, Bouwhuis, B.A., Suralvo, M., McCrea, J.L., Palumbo, G., Hibbard, G.D. "Micro-Truss Nanocrystalline Ni Hybrids." *Acta Materialia* 57, 932-939 (2009). [DOI]

2009 Leung, A., **Gordon, L.M.**, Skrinskas, T., Szwedowski, T., Whyne, C.M. "Effects of bone density alterations on strain patterns in the pelvis: application of a finite element model." *Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine* 223, 965-979 (2009). [DOI]

2007 Hardisty, M., **Gordon, L.M.**, Agarwal, P., Skrinskas, T., Whyne, C.M. "Quantitative characterization of metastatic disease in the spine. Part I. Semiautomated segmentation using atlas-based deformable registration and the level set method." *Medical Physics* 34, 3127 (2007). [DOI]

2007 Whyne, C.M., Hardisty, M., Wu, F., Skrinskas, T., **Gordon, L.M.**, Clemons, M., Basran, P.S. "Quantitative characterization of metastatic disease in the spine. Part II. Histogram-based analyses". *Medical Physics* 34, 3279 (2007). [DOI]

Invited Talks

2012 **Gordon, L.M.** "Defining Interfaces and Interphases." Tomographers Anonymous, Northwestern University. *Evanston, IL.*

Talks

2013 Cohen, M.J., **Gordon, L.M.**, Joester, D. "Correlative Microscopy and Spectroscopy of Buried Interfaces in Tooth Enamel." International Conference on the Chemistry and Biology of Mineralized Tissues. *Lake Geneva, WI.*

2013 **Gordon, L.M.**, Cohen, M.J., Joester, D. "Grain boundary and triple junction chemistry in nanocrystalline tooth enamel." Cameca Atom Probe Tomography User Meeting. *Madison, WI.*

2013 Cohen, M.J., **Gordon, L.M.**, Joester, D. "Atom Probe Tomography Reconstruction of Single Crystalline Metal Oxides." Cameca Atom Probe Tomography User Meeting. *Madison, WI.*

2013 **Gordon, L.M.**, Cohen, M.J., Joester, D. "Correlative Microscopy and Spectroscopy of Buried Interfaces in Tooth Enamel." Microscopy & Microanalysis Meeting. *Indianapolis, IN.*

2013 **Gordon, L.M.**, Cohen, M.J., Joester, D. "Towards Atom Probe Tomography of Hybrid Organic-Inorganic Nanoparticles." Microscopy & Microanalysis Meeting. *Indianapolis, IN.*

2013 Cohen, M.J., **Gordon, L.M.**, Suram, S.K., Kaluskar, K., Rajan, K., Valley, J.W., Joester, D. "Constraining Atom Probe Tomography Reconstructions of Crystalline Oxides." Microscopy & Microanalysis Meeting. *Indianapolis, IN.*

2013 **Gordon, L.M.**, Joester, D. "Understanding the biological stabilization of ferrihydrite and its transformation to magnetite." American Physical Society Meeting. *Baltimore, MD.*

2012 **Gordon, L.M.**, Joester, D. "Buried Interfaces in Mouse Incisor Enamel." Spring Meeting of the Materials Research Society. *San Francisco, CA.*

2011 **Gordon, L.M.**, Joester, D. "Atom Probe Tomography of Buried Organic-Inorganic Interfaces in Biological Minerals." Society of Engineering Science Meeting. *Evanston, IL.*

2011 **Gordon, L.M.**, Joester, D. "Buried Organic-Inorganic Interfaces in Mineralized Biological Tissues." 11th International Symposium on Biomineralization. *Noosa, Queensland, Australia.*

2011 **Gordon, L.M.**, Joester, D. "Buried Organic-Inorganic Interfaces in Biological Minerals." Cameca Atom Probe Tomography User Meeting. *Madison, WI.*

2009 **Gordon, L.M.**, Joester, D. "Atom Probe Tomgraphy of Buried Organic in the Chiton Tooth." Fall Meeting of the Materials Research Society. *Boston, MA.*

2006 **Gordon, L.M.**, Hardisty, M., Skrinskas, T., Wu, F., Whyne, C.M. "Automated Atlas-based 3D segmentation of the Metastatic Spine." 40th Annual Canadian Orthopaedic Research Society Meeting. *Toronto, ON.*

Published Proceedings

2013 **Gordon, L.M.**, Joester, D."Understanding the biological stabilization of ferrihydrite and its transformation to magnetite" *Bulletin of the American Physical Society*. (2013)

2012 Suram, S.K., Kaluskar, K., **Gordon, L.M.**, Joester, D., Rajan, K. "Atom Probe Tomography of Organic/Inorganic Interfaces in Biominerals." *Microscopy & Microanalysis.* 18, Supplement S2, 1608-1609 (2012)

2012 Larson, D.J., Smentkowski, V.S., **Gordon, L.M.**, Joester, D., Inoue, K., Reinhard, D.A., Prosa, T.J., Olson, D., Lawrence, D., Clifton, P.H., Ulfig, R.M., Martin, I., Snoeyenbos, D., Kelly, T.F. "New Applications in Atom Probe Tomography." *Microscopy & Microanalysis.* 18, Supplement S2, 926-927 (2012)

2008 **Gordon, L.M.**, Hardisty, M., Skrinskas, T., Wu, F., Whyne, C.M. "Automated Atlas-based 3D segmentation of the Metastatic Spine." *Journal of Bone and Joint Surgery, British Volume* 90 Supplement 1, 128 (2008)

2008 Wu, F., Burnes, D., **Gordon, L.M.**, Hardisty, M., Skrinskas, T., Basran, P., Whyne, C.M. "Quantitative Characterization of Metastatic Disease in the Spine and Development of and Automated Tracking Tool." *Journal of Bone and Joint Surgery, British Volume* 90 Supplement 1, 129 (2008)

2008 Whyne, C.N,, Skrinskas, T., Yee, A., **Gordon, L.M.**, Akens, M., Hardisty, M., Burch, S., Wilson, B., Bisland, S., "Does Photodynamic Therapy Affect the Structural Integrity of Vertebral Bone." *Journal of Bone and Joint Surgery, British Volume* 90 Supplement 1, 135 (2008)

Posters

2013 **Gordon, L.M.**, Joester, D. "Buried Organic/Inorganic Interfaces in Biological Minerals" Northwestern University John E. Hilliard Memorial Symposium. *Evanston, IL.*

2012 Ehrke, H.U., Smentkowski, V.S., **Gordon, L.M.**, Joester, D., Prosa, T.J., Clifton, P.H., Snoeyenbos, D., "Atom Probe Tomography - 3D Subnanometer chemical imaging extended to Photovoltaic and Geological Materials." European Mineralogical Conference . *Frankfurt, Germany.*

2012 Ehrke, H.U., Larson, D.J., Smentkowski, V.S., **Gordon, L.M.**, Joester, D., Prosa, T.J., Clifton, P.H., Snoeyenbos, D., "New Applications in Atom Probe Tomography." Microscopy *&* Microanalysis. *Phoenix, AZ.*

2012 **Gordon**, **L.M.**, Joester, D. "Model System for Biomimetic Magnetite Mineralization" Gordon Research Conference on Biomineralization. *New London, NH.*

2012 Larson, D.J., Smentkowski, V.S., **Gordon**, **L.M.**, Joester, D., Inoue, K., Reinhard, D.A., Prosa, T.J., Olson, D., Lawrence, D., Clifton, P.H., Ulfig, R.M., Martin, I., Snoeyenbos, D., Kelly, T.F. "New Applications in Atom Probe Tomography." Microscopy *&* Microanalysis. *Phoenix, AZ.*

2012 Suram, S.K., Kaluskar, K., **Gordon**, **L.M.**, Joester, D., Rajan, K. "Atom Probe Tomography of Organic/Inorganic Interfaces in Biominerals." Microscopy *&* Microanalysis. *Phoenix, AZ.*

2012 Larson, D.J., Smentkowski, V.S., **Gordon**, **L.M.**, Joester, D., Inoue, K., Reinhard, D.A., Prosa, T.J., Olson, D., Lawrence, D., Clifton, P.H., Ulfig, R.M., Martin, I., Snoeyenbos, D., Horreard, F., Kelly, T.F. "New Applications in Atom Probe Tomography." SCANDEM 2012: Annual Meeting of the Nordic Microscopy Society. *Bergen, Norway*

2012 Larson, D.J., Smentkowski, V.S., **Gordon**, **L.M.**, Joester, D., Inoue, K., Reinhard, D.A., Prosa, T.J., Olson, D., Lawrence, D., Clifton, P.H., Ulfig, R.M., Martin, I., Snoeyenbos, D., Kelly, T.F. "New Applications in Atom Probe Tomography." International Field Emission Symposium. *Tuscaloosa, AL.*

2010 **Gordon**, **L.M.**, Joester, D. "Nanoscale Chemical Tomography of Buried Organic-Inorganic Interfaces in Biominerals." Gordon Research Conference on Biomineralization. *New London, NH.*

2006 Hardisty, M., Skrinskas, T., **Gordon**, **L.M.**, Whyne, C.M. "A Repeatable Bone Quality Measurement Techniquiqe Using 3D Stereology." 40th Annual Canadian Orthopaedic Research Society Meeting. *Toronto, ON.*

2006 Whyne, C.M., Skrinskas, T., Yee, A., **Gordon**, **L.M.**, Akens, M., Hardisty, M., Burch, S., Wilson, B., Bisland, S. "Does Photodynamic Therapy Affect the Structural Integrity of Vertebral Bone?" 40th Annual Canadian Orthopaedic Research Society Meeting. *Toronto, ON.*

2006 Wu, F., Burnes, D., **Gordon**, **L.M.**, Hardisty, M., Skrinskas, T., Basran, P., Whyne, C.M. "Quantitative Characterization of Metastatic Disease in the Spine and Development of an Automated Tracking Tool." 40th Annual Canadian Orthopaedic Research Society Meeting. *Toronto, ON.*

2006 **Gordon**, **L.M.**, Hardisty, M., Skrinskas, T., Wu, F., Whyne, C.M. "Atlas-Based Segmentation in the Metastatic Spine via 3D Deformable Registration." 52nd Annual Meeting of the Orthopaedic Research Society. *Chicago, IL.*

2006 Hardisty, M., Skrinskas, T., **Gordon**, **L.M.**, Whyne, C.M. "A Repeatable Stereologic Method to Measure Bone Quality." 52nd Annual Meeting of the Orthopaedic Research Society. *Chicago, IL.*

2006 Whyne, C.N,, Skrinskas, T., Yee, A., **Gordon**, **L.M.**, Akens, M., Hardisty, M., Burch, S., Wilson, B., Bisland, S., "Structural Effects of Photodynamic Therapy on Vertebral Bone. 52nd Annual Meeting of the Orthopaedic Research Society." *Chicago, IL.*

2006 Wu, F., Burnes, D., **Gordon**, **L.M.**, Hardisty, M., Skrinskas, T., Basran, P., Whyne, C.M. "Quantitative Characterization of Metastatic Disease in the Spine and Development of and Automated Tracking Tool." 52nd Annual Meeting of the Orthopaedic Research Society. *Chicago, IL.*

Major Media Coverage

2013 "Strange Biology Inspires the Best New Materials", Nadia Drake, *Wired*. Mar 27th, 2013. [URL]
Featured on *Wired.com* front page [CACHE]

2011 "Rock-Munching Mollusks A Model For Artificial Bones", Joe Palca, *National Public Radio*. Jan 13th, 2011. [URL] [MP3] [TRANSCRIPT]

2011 "Teething trouble", Kerri Smith et al., *Nature podcast*. Jan 13th, 2011. [URL] [MP3]

2011 "Imaging organic-inorganic interfaces in the tooth", *Nature Methods* 8, 199 (2011). [DOI]

2011 "Cracking a Tooth". *US News*. Jan 13th, 2011. [URL]

Awards

2013 **Microscopy & Microanalysis Meeting Award**, Microanalysis Society.

2009 **Finalist**. Materials Research Society Science as Art Competition.

2009 **Image of Distinction**. Nikon Small World — Photomicrography Competition. [URL] [IMAGE]

2008 **First Place: Technical Report.** Canadian National Concrete Canoe Competition, Halifax, NS.

2007 **First Place: Technical Presentation.** Canadian National Concrete Canoe Competition, Kingston, ON.

Professional Service & Extracurriculars

2012 Symposium Assistant, Materials Research Society Spring Meeting. San Francisco, CA.

2010 Science Fair Judge. Chicago Public Schools, Area 9.

2010 Science Fair Judge. Chicago Public Schools, Area 4.

2009 Student-Faculty Representative, Materials Science Student Association, Northwestern University.

2007-2008 Project manager, University of Toronto Concrete Canoe Team.

2007 Tutored high-school level physics and math.

2006-2008 Mentored first year Materials Science and Engineering students, University of Toronto.

2005-2007 Head of concrete mix and composite design, University of Toronto Concrete Canoe Team.

2006 Vice-chair coordinating orientation week and distributing financial aid for one thousand incoming University of Toronto engineering students.

2003 Solo Photography Exhibition, Albert White Gallery. Toronto, ON.

Professional Societies

American Association for the Advancement of Science, American Physical Society, Materials Research Society, Microscopy Society of America.