CURRICULUM VITAE – Ondrej Dyck

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Date of Birth: June 19, 1983 **Nationality:** United States of America

Principle Areas of Research:
Atom-by-atom fabrication using electron beams for the investigation of prototype devices, emergent material properties, and structural transitions.

Education:
Appalachian State University *Summa Cum Laude* 2011 Math and Physics
University of Tennessee, Knoxville Ph.D. 2015 Materials Science and Engineering

Professional Experience:
2021-present Research Professional, Electron Microscopy, Center for Nanophase Materials Sciences
2019-2020 Technical Professional, Electron Microscopy, Center for Nanophase Materials Sciences
2016-2019 Post-Doctoral Researcher, Electron Microscopy, Center for Nanophase Materials Sciences

Professional Activities, Honors, Awards:
Serving on reviewer board for Nanomaterials (2020-present)
Guest editor for Advanced Functional Materials special issue *Atomic Fabrication with Electron Beams and Scanning Probes* (2019)
R&D 100 award (2019)
Co-organizer for *Atom by Atom Fabrication via Electron Beams and Scanning Probes* workshop (2018)
American Vacuum Society International Symposium & Exhibition 65 Focus Topic Co-chair (2017-2018)

Selected Publications:
Total publications: Journal: 77, Book Chapters: 1

1. Dyck, O.; Yeom, S.; Lupini, A. R.; Swett, J. L.; Hensley, D.; Yoon, M.; Jesse, S. Top-down Fabrication of Atomic Patterns in Twisted Bilayer Graphene. *Advanced Materials* **2023**, 2302906.
2. Dyck, O.; Yeom, S.; Dillender, S.; Lupini, A. R.; Yoon, M.; Jesse, S. The Role of Temperature on Defect Diffusion and Nanoscale Patterning in Graphene. *Carbon* **2023**, *201*, 212–221.
3. Dyck, O.; Lupini, A. R.; Jesse, S. Atom-by-Atom Direct Writing. *Nano Letters* **2023**, *23* (6), 2339–2346.
4. Dyck, O.; Lupini, A. R.; Jesse, S. A Platform for Atomic Fabrication and In Situ Synthesis in a Scanning Transmission Electron Microscope. *Small Methods* **2023**, 2300401.
5. Roccapriore, K. M.; Dyck, O.; Oxley, M. P.; Ziatdinov, M.; Kalinin, S. V. Automated Experiment in 4D-STEM: Exploring Emergent Physics and Structural Behaviors. *ACS nano* **2022**, *16* (5), 7605–7614.
6. Roccapriore, K. M.; Boebinger, M. G.; Dyck, O.; Ghosh, A.; Unocic, R. R.; Kalinin, S. V.; Ziatdinov, M. Probing Electron Beam Induced Transformations on a Single-Defect Level via Automated Scanning Transmission Electron Microscopy. *ACS nano* **2022**, *16* (10), 17116–17127.
7. Dyck, O.; Swett, J. L.; Evangeli, C.; Lupini, A. R.; Mol, J. A.; Jesse, S. Mapping Conductance and Switching Behavior of Graphene Devices In Situ. *Small Methods* **2022**, *6* (3), 2101245.
8. Dyck, O.; Lupini, A. R.; Rack, P. D.; Fowlkes, J.; Jesse, S. Controlling Hydrocarbon Transport and Electron Beam Induced Deposition on Single Layer Graphene: Toward Atomic Scale Synthesis in the Scanning Transmission Electron Microscope. *Nano Select* **2022**, *3* (3), 643–654.
9. Lapano, J.; Dyck, O.; Lupini, A. R.; Ko, W.; Li, H.; Miao, H.; Lee, H. N.; Li, A.-P.; Brahlek, M.; Jesse, S. Van Der Waals Epitaxy Growth of Bi2Se3 on a Freestanding Monolayer Graphene Membrane: Implications for Layered Materials and Heterostructures. *ACS Applied Nano Materials* **2021**, *4* (8), 7607–7613.
10. Dyck, O.; Zhang, L.; Yoon, M.; Swett, J. L.; Hensley, D.; Zhang, C.; Rack, P. D.; Fowlkes, J. D.; Lupini, A. R.;

Jesse, S. Doping Transition-Metal Atoms in Graphene for Atomic-Scale Tailoring of Electronic, Magnetic, and Quantum Topological Properties. *Carbon* **2021**, *173*, 205–214.

11. Maxim, Z.; Jesse, S.; Sumpter, B. G.; Kalinin, S. V.; Dyck, O. Tracking Atomic Structure Evolution during Directed Electron Beam Induced Si-Atom Motion in Graphene via Deep Machine Learning. *Nanotechnology* **2020**, *32* (3), 035703.
12. Dyck, O.; Zhang, C.; Rack, P. D.; Fowlkes, J. D.; Sumpter, B.; Lupini, A. R.; Kalinin, S. V.; Jesse, S. Electron-Beam Introduction of Heteroatomic Pt–Si Structures in Graphene. *Carbon* **2020**, *161*, 750–757.
13. Dyck, O.; Yoon, M.; Zhang, L.; Lupini, A. R.; Swett, J. L.; Jesse, S. Doping of Cr in Graphene Using Electron Beam Manipulation for Functional Defect Engineering. *ACS Applied Nano Materials* **2020**, *3* (11), 10855–10863.
14. Ziatdinov, M.; Dyck, O.; Li, X.; Sumpter, B. G.; Jesse, S.; Vasudevan, R. K.; Kalinin, S. V. Building and Exploring Libraries of Atomic Defects in Graphene: Scanning Transmission Electron and Scanning Tunneling Microscopy Study. *Science advances* **2019**, *5* (9), eaaw8989.
15. Ziatdinov, M.; Dyck, O.; Jesse, S.; Kalinin, S. V. Atomic Mechanisms for the Si Atom Dynamics in Graphene: Chemical Transformations at the Edge and in the Bulk. *Advanced Functional Materials* **2019**, *29* (52), 1904480.
16. Kalinin, S. V.; Dyck, O. Materials and Devices with Probes and Beams: Down to the Atomic Level and Back Up. *Advanced Functional Materials* **2019**, *29* (52).
17. Dyck, O.; Ziatdinov, M.; Lingerfelt, D. B.; Unocic, R. R.; Hudak, B. M.; Lupini, A. R.; Jesse, S.; Kalinin, S. V. Atom-by-Atom Fabrication with Electron Beams. *Nature Reviews Materials* **2019**, *4* (7), 497–507.
18. Dyck, O.; Jesse, S.; Kalinin, S. V. A Self-Driving Microscope and the Atomic Forge. *MRS Bulletin* **2019**, *44* (9), 669–670.
19. Dyck, O.; Kim, S.; Kalinin, S. V.; Jesse, S. E-Beam Manipulation of Si Atoms on Graphene Edges with an Aberration-Corrected Scanning Transmission Electron Microscope. *Nano Research* **2018**, *11*, 6217–6226.
20. Dyck, O.; Kim, S.; Jimenez-Izal, E.; Alexandrova, A. N.; Kalinin, S. V.; Jesse, S. Building Structures Atom by Atom via Electron Beam Manipulation. *Small* **2018**, *14* (38), 1801771.
21. Ziatdinov, M.; Dyck, O.; Maksov, A.; Li, X.; Sang, X.; Xiao, K.; Unocic, R. R.; Vasudevan, R.; Jesse, S.; Kalinin, S. V. Deep Learning of Atomically Resolved Scanning Transmission Electron Microscopy Images: Chemical Identification and Tracking Local Transformations. *ACS nano* **2017**, *11* (12), 12742–12752.
22. Dyck, O.; Kim, S.; Kalinin, S. V.; Jesse, S. Placing Single Atoms in Graphene with a Scanning Transmission Electron Microscope. *Applied Physics Letters* **2017**, *111* (11).

Book Chapters:

Qiao Q (Ed.). Organic Solar Cells: Materials, Devices, Interfaces, and Modelling, Chapter 9: Nanophase Separation in Organic Solar Cells. CRC Press, 2015

Patents:

(1) Kalinin, S. V.; Jesse, S.; Borisevich, A. Y.; Dyck, O. E.; Sumpter, B. G.; UNOCIC, R. R. Atomic-Scale e-Beam Sculptor. US11518674B2, December 6, 2022. https://patents.google.com/patent/US11518674B2/en

(2) Kalinin, S. V.; Jesse, S.; Dyck, O. E.; Sumpter, B. G. Beam Controlled Nano-Robotic Device. US10777381B1, September 15, 2020.

(3) Geohegan, D. B.; Keum, J. K.; POPLAWSKY, J. D.; Xiao, K.; Yang, B.; DYCK, O. E. Hybrid Perovskite Films. US20170098514A1, April 6, 2017.