Stephen Jesse, PhD

Distinguished Research Scientist
Section Head for Nanomaterials Characterization
The Center for Nanophase Materials Sciences
Oak Ridge National Laboratory
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Research Interests:

- Developing and using novel microscopy methods to induce and study nano- and atomic scale transformations
- Building new understanding of material behavior at fundamental length scales
- Fabricate structures at nano and atomic scales for novel devices
- Developing large scale data analytics of high-dimensional, multi-spectral information for functional imaging
- Microscopy and spectroscopy technique development using advanced data acquisition, and feedback and control for scanning probe, electron, ion microscopies

Education:

Ph.D. 2004	University of Tennessee	Materials Science
M.S. 2000	University of Tennessee	Mechanical Engineering
B.S. 1996	University of Tennessee	Mechanical Engineering

Professional Experience:

2021 – Present	Distinguished Scientist, Section Head of the Nanomaterials Characterization Section at The Center for Nanophase Materials Sciences
2022 – 2023	Interim Deputy Director of the Oak Ridge Quantum Science Center
2020 – 2022	Group Leader of the Functional Atomic Force Microscopy Group at The Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2018 – Present	PI of FWP in Quantum Information Sciences, Oak Ridge National Laboratory
2014 – 2018	Senior Scientist, Leader of the Directed Nanoscale Transformations Theme, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2008 – 2014	R&D Staff Scientist, Scanning Probe Microscopy Group Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2004 – 2008	Postdoctoral Research Associate, Scanning Probe Microscopy Group Center for Nanophase Materials Sciences, Oak Ridge National Laboratory
2000 – 2004	Graduate Research Asst., University of Tennessee, Knoxville, Materials Science
1996 – 2000	Graduate Research Asst., University of Tennessee, Knoxville, Mechanical Eng.

Honors, Awards:

2020 UT-Battelle Award: Outstanding Scholarly Output in Science and Technology
2018 R&D100 Award: The Atomic Forge

2016 R&D100 Award: G-mode Microscopy
2016 Microscopy Today Innovation Award: G-Mode
2016 ORNL Significant Event award for BEAM project
2015 ORNL Significant Event award for Electron Microscopy Control (SENS)
2014 UT-Battelle Technology Commercialization Award
2012 American Ceramic Society Ceramographic Competition Awards
2011 UT-Battelle Scientific Research Team Award: Electrochemical Strain Microscopy
2011 Microscopy Today Innovation Award: Electrochemical Strain Microscopy
2010 Roland B. Snow Award, American Ceramics Society: Electrochemical Strain Microscopy
2010 R&D 100 Award for "Z-therm Modulated Thermal Analysis"
2010 Microscopy Today Innovation Award: Band Excitation
2008 Southeast FLC Excellence in Technology Transfer
2008 Materials Research Society Best Poster Award
2008 R&D 100, "Band Excitation Method for Scanning Probe Microscopy"
2008 Cosslett Award, best invited paper, Microscopy & MicroAnalysis Conference
2006 ORNL Director's Award, Outstanding Team Achievement in Science and Technology

Patents

1 patent prepared, 1 patent submitted, 14 patents issued:

10,400,351: Bulk nanofabrication with single atomic plane precision via atomic-level sculpting
9,612,257: Full Information Acquisition in Scanning Probe Microscopy and Spectroscopy
9,541,576: Electrochemical Force Microscopy
8,719,961: Real Space Mapping of Ionic Diffusion and Electrochemical Activity in Energy Storage and Conversion Materials
8,752,211: Real Space Mapping of Oxygen Vacancy Diffusion and Electrochemical Transformations by Hysteretic Current Reversal Curve Measurements
8,540,542: Transparent Conductive Nano-Composites
8,484,759: Spatially Resolved Quantitative Mapping of Thermomechanical Properties and Phase Transition Temperatures Using Scanning Probe Microscopy
8,384,020: Spatially Resolved Thermal Desorption/Ionization Coupled with Mass Spectrometry
7,775,086: Band Excitation Method Applicable to Scanning Probe Microscopy
7,491,934: SEM Technique for Imaging and Measuring Electronic Transport in Nanocomposites Based on Electric Field Induced Contrast

Recent Funding (last 6 years)

PI: "Understanding and Controlling Entangled and Correlated Quantum States in Confined Solid-state Systems Created via Atomic Scale Manipulation". US DOE, Quantum Information Sciences, ERKCK47, renewed, $1.5M/year, FY21-FY24
PI: "Enabling Topological Quantum Information Processing", $1.6M FY19-FY20
CoPI: Center Nanophase Materials Sciences, Directed Nanoscale Transformations, Part of: Department of Energy, Office of Basic Energy Sciences Proposal ERKZ99, $21.3M FY16-FY19.
PI: "Fabricating Qubits from Low-Dimensional Materials", FY17 $850k FY17-18
PI: "Sculpting Silicon: 3D fabrication of semiconductors on the atomic level",158K, FY18
CoPI: "Hyperspectral Compressive Neutron Lensless Imaging", 500k, FY18-19

CoPI: "Operando 4D STEM to Probe Dynamic Chemical Reactivity: Integrated Approach to Understand and Design Functional Interfacial Chemistry", 900k, FY18-19
PI: Proctor & Gamble: WFO "Dynamic Force Distance Measurements of Colloidal Interactions", requested $80k FY17
PI: "Exploring Structure and Functionality of Oxides in Real Space: "Deep Data" in Atomic Resolution Imaging", $900k FY15-16

Postdoctoral Advisor/Co-advisor to:
Shiva Raghuraman, 2021 - present
Ondrej Dyck, 2017 – 2019, Currently Staff at ORNL
Liam Collins, 2015 – 2018, Currently Staff at ORNL
Suhas Somnath, 2014 – 2017, Currently Staff at ORNL
Sangmo Yang, 2014-2017, Currently Professor in S. Korea
Alex Belianinov, 2013-2016, Currently Staff at Sandia National Laboratory
Anton Ievlev, 2012-2015, Currently Staff at ORNL
Evgheni Strelcov, 2013-2016, Currently Postdoc at NIST, Gaithersburg
Thomas Arruda, 2011-2014, Currently Professor at Salve Regina University
Amit Kumar, 2010-2014, Currently Professor at Queen's College, IR
Yunseok Kim, 2010-2013, Currently Professor in S. Korea

Professional Activities
Chair of American Physical Society Group on Instrumentation and Measurement Science 2019-2021
Member of: Materials Research Society, AVS, APS, Microscopy and Microanalysis Association
2011, 2012 Lead organizer for two MRS symposia focused on SPM microscopy
Workshops in advanced data analysis: Microscopy and Microanalysis 2017, 2018, Big Data Analysis workshop at ORNL, 2018, Materials Research Society Fall 2017, MRS webinar on atomic level manipulation.
PhD Thesis Committee Member

Publications
Author of >300 articles in refereed journals, H-index = 81 (google scholar)
Including: 16 Nature family, 33 ACS Nano, 12 Advanced Materials, 11 Advanced Functional Materials, 11 Nano Letters, 8 PRL, 2 PNAS, 1 Science
Full List: https://scholar.google.com/citations?user=uiTAx2cAAAAJ&hl=en

Peer-Reviewed Publications:

1 Sriboriboon, P., Qiao, H. M., Kwon, O., Vasudevan, R. K., **Jesse**, S. & Kim, Y. Deep learning for exploring ultra-thin ferroelectrics with highly improved sensitivity of piezoresponse force microscopy. npj Comput. Mater. 9, 8 (2023). https://doi.org:10.1038/s41524-023-00982-0
2 Kelley, K. P., Kalinin, S. V., Eliseev, E., Raghuraman, S., **Jesse**, S., Maksymovych, P. & Morozovska, A. N. Probing Temperature-Induced Phase Transitions at Individual Ferroelectric Domain Walls. Adv. Electron. Mater. 9, 10 (2023). https://doi.org:10.1002/aelm.202200552

3 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. Adv. Mater., 11 (2023). https://doi.org:10.1002/adma.202302906
4 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 201, 212-221 (2023). https://doi.org:10.1016/j.carbon.2022.09.006
5 Dyck, O., Lupini, A. R. & **Jesse**, S. A Platform for Atomic Fabrication and In Situ Synthesis in a Scanning Transmission Electron Microscope. Small Methods, 10 (2023). https://doi.org:10.1002/smtd.202300401
6 Dyck, O., Lupini, A. R. & **Jesse**, S. Atom-by-Atom Direct Writing. Nano Letters 23, 2339-2346 (2023). https://doi.org:10.1021/acs.nanolett.3c00114
7 Checa, M., Kelley, K. P., Vasudevan, R., Collins, L. & **Jesse**, S. Automated piezoresponse force microscopy domain tracking during fast thermally stimulated phase transition in CuInP2S6 (*). Nanotechnology 34, 7 (2023). https://doi.org:10.1088/1361-6528/acd34d
8 Boebinger, M. G., Brea, C., Ding, L. P., Misra, S., Olunloyo, O., Yu, Y. L., Xiao, K., Lupini, A. R., Ding, F., Hu, G. X., Ganesh, P., **Jesse**, S. & Unocic, R. R. The Atomic Drill Bit: Precision Controlled Atomic Fabrication of 2D Materials. Adv. Mater. 35, 11 (2023). https://doi.org:10.1002/adma.202210116
9 Kelley, K. P., Morozovska, A. N., Eliseev, E. A., Sharma, V., Yilmaz, D. E., van Duin, A. C. T., Ganesh, P., Borisevich, A., **Jesse**, S., Maksymovych, P., Balke, N., Kalinin, S. V. & Vasudevan, R. K. Oxygen Vacancy Injection as a Pathway to Enhancing Electromechanical Response in Ferroelectrics. Adv. Mater. 34, 10 (2022). https://doi.org:10.1002/adma.202106426
10 Kalinin, S. V., **Jesse**, S. & Lupini, A. R. A QUANTUM LAB IN A BEAM. Phys. Today 75, 30-36 (2022). https://doi.org:10.1063/pt.3.5018
11 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 6, 7 (2022). https://doi.org:10.1002/smtd.202101245
12 Dyck, O., Swett, J. L., Evangeli, C., Lupini, A. R., Mol, J. & **Jesse**, S. Contrast Mechanisms in Secondary Electron e-Beam Induced Current (SEEBIC) Imaging. Microsc. microanal. 28, 1567-1583 (2022). https://doi.org:10.1017/s1431927622000824
13 Vasudevan, R. K., Kelley, K. P., Hinkle, J., Funakubo, H., **Jesse**, S., Kalinin, S. V. & Ziatdinov, M. Autonomous Experiments in Scanning Probe Microscopy and Spectroscopy: Choosing Where to Explore Polarization Dynamics in Ferroelectrics. ACS Nano 15, 11253-11262 (2021). https://doi.org:10.1021/acsnano.0c10239
14 Somnath, S., Vasudevan, R. K., **Jesse**, S., Kalinin, S., Rao, N., Brumgard, C., Wang, F. Y., Kuchar, O., Shankar, A., Mintz, B., Arenholz, E., Michael, J. R. & Oral, S. in 21st Smoky Mountains Computational Sciences and Engineering Conference (SMC). 58-75 (Springer International Publishing Ag, 2022).
15 Schon, N., Schierholz, R., **Jesse**, S., Yu, S. C., Eichel, R. A., Balke, N. & Hausen, F. Signal Origin of Electrochemical Strain Microscopy and Link to Local Chemical Distribution in Solid State Electrolytes. Small Methods 5, 7 (2021). https://doi.org:10.1002/smtd.202001279
16 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 32, 6 (2021). https://doi.org:10.1088/1361-6528/abb8a6
17 Lapano, J., Dyck, O., Lupini, A. R., Ko, W., Li, H. X., Miao, H., Lee, H. N., Li, A. P., Brahlek, M., **Jesse**, S. & Moore, R. G. van der Waals Epitaxy Growth of Bi2Se3 on a Freestanding Monolayer Graphene Membrane: Implications for Layered Materials and Heterostructures. ACS Appl. Nano Mater. 4, 7607-7613 (2021). https://doi.org:10.1021/acsanm.1c01170

18 Kelley, K. P., Ren, Y., Dasgupta, A., Kavle, P., **Jesse**, S., Vasudevan, R. K., Cao, Y., Martin, L. W. & Kalinin, S. V. Probing Metastable Domain Dynamics via Automated Experimentation in Piezoresponse Force Microscopy. ACS Nano 15, 15096-15103 (2021). https://doi.org:10.1021/acsnano.1c05455
19 Kelley, K. P., Kalinin, S. V., Ziatdinov, M., Paull, O., Sando, D., Nagarajan, V., Vasudevan, R. K. & **Jesse**, S. Probing polarization dynamics at specific domain configurations: Computer-vision based automated experiment in piezoresponse force microscopy. Appl. Phys. Lett. 119, 7 (2021). https://doi.org:10.1063/5.0062046
20 Kalinin, S. V., Ziatdinov, M., Hinkle, J., **Jesse**, S., Ghosh, A., Kelley, K. P., Lupini, A. R., Sumpter, B. G. & Vasudevan, R. K. Automated and Autonomous Experiments in Electron and Scanning Probe Microscopy. ACS Nano 15, 12604-12627 (2021). https://doi.org:10.1021/acsnano.1c02104
21 Kalinin, S. V., Dyck, O., **Jesse**, S. & Ziatdinov, M. Exploring order parameters and dynamic processes in disordered systems via variational autoencoders. Sci. Adv. 7, 9 (2021). https://doi.org:10.1126/sciadv.abd5084
22 Dyck, O., Ziatdinov, M., **Jesse**, S., Bao, F., Nobakht, A. Y., Maksov, A., Sumpter, B. G., Archibald, R., Law, K. J. H. & Kalinin, S. V. Probing potential energy landscapes via electron-beam-induced single atom dynamics. Acta Mater. 203, 5 (2021). https://doi.org:10.1016/j.actamat.2020.116508
23 Dyck, O., Zhang, L. Z., 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 173, 205-214 (2021). https://doi.org:10.1016/j.carbon.2020.11.015
24 Dyck, O., Swett, J. L., Lupini, A. R., Mol, J. A. & **Jesse**, S. Imaging Secondary Electron Emission from a Single Atomic Layer. Small Methods 5, 7 (2021). https://doi.org:10.1002/smtd.202000950
25 Devineni, P., Ganesh, P., Sivadas, N., Dhakane, A., Maheshwari, K., Herrmannova, D., Kannan, R., Lim, S. H., Potok, T. E., Chipka, J., Mudalige, P., Coletti, M., Dash, S., Paul, A. K., Oral, S., Wang, F. Y., Kay, B., Allen-Dumas, M., Brelsford, C., New, J., Berres, A., Kurte, K., Sanyal, J., Sweet, L., Gunaratne, C., Ziatdinov, M., Vasudevan, R., Kalinin, S., Kotevska, O., Bilheux, J., Bilheux, H., Granroth, G. E., Proffen, T., Riedel, R., Peterson, P., Kulkarni, S., Kelley, K., **Jesse**, S. & Parsa, M. in 21st Smoky Mountains Computational Sciences and Engineering Conference (SMC). 361-382 (Springer International Publishing Ag, 2022).
26 Creange, N., Kelley, K. P., Smith, C., Sando, D., Paull, O., Valanoor, N., Somnath, S., **Jesse**, S., Kalinin, S. V. & Vasudevan, R. K. Propagation of priors for more accurate and efficient spectroscopic functional fits and their application to ferroelectric hysteresis. Mach. Learn.-Sci. Technol. 2, 8 (2021). https://doi.org:10.1088/2632-2153/abfbba
27 Ziatdinov, M., Kim, D., Neumayer, S., Vasudevan, R. K., Collins, L., **Jesse**, S., Ahmadi, M. & Kalinin, S. V. Imaging mechanism for hyperspectral scanning probe microscopy via Gaussian process modelling. npj Comput. Mater. 6, 7 (2020). https://doi.org:10.1038/s41524-020-0289-6
28 Ziatdinov, M., Kim, D., Neumayer, S., Collins, L., Ahmadi, M., Vasudevan, R. K., **Jesse**, S., Ann, M. H., Kim, J. H. & Kalinin, S. V. Super-resolution and signal separation in contact Kelvin probe force microscopy of electrochemically active ferroelectric materials. J. Appl. Phys. 128, 8 (2020). https://doi.org:10.1063/5.0013847
29 Zhang, C., Dyck, O., Garfinkel, D. A., Stanford, M. G., Belianinov, A. A., Fowlkes, J. D., **Jesse**, S. & Rack, P. D. Pulsed Laser-Assisted Helium Ion Nanomachining of Monolayer Graphene-Direct-Write Kirigami Patterns (vol 9, 1394, 2019). Nanomaterials 10, 1 (2020). https://doi.org:10.3390/nano10020273
30 Vasudevan, R. K., Kelley, K. P., Eliseev, E., **Jesse**, S., Funakubo, H., Morozovska, A. & Kalinin, S. V. Bayesian inference in band excitation scanning probe microscopy for optimal dynamic model selection in imaging. J. Appl. Phys. 128, 10 (2020). https://doi.org:10.1063/5.0005323

31 Oxley, M. P., Yin, J., Borodinov, N., Somnath, S., Ziatdinov, M., Lupini, A. R., **Jesse**, S., Vasudevan, R. K. & Kalinin, S. V. Deep learning of interface structures from simulated 4D STEM data: cation intermixing vs. roughening. Mach. Learn.-Sci. Technol. 1, 8 (2020). https://doi.org:10.1088/2632-2153/aba32d
32 Ovchinnikov, O. S., O'Hara, A., **Jesse**, S., Hudak, B. M., Yang, S. Z., Lupini, A. R., Chisholm, M. F., Zhou, W., Kalinin, S. V., Borisevich, A. Y. & Pantelides, S. T. Detection of defects in atomic-resolution images of materials using cycle analysis. Adv. Struct. Chem. Imag. 6, 9 (2020). https://doi.org:10.1186/s40679-020-00070-x
33 Nobakht, A. Y., Dyck, O., Lingerfelt, D. B., Bao, F., Ziatdinov, M., Maksov, A., Sumpter, B. G., Archibald, R., **Jesse**, S., Kalinin, S. V. & Law, K. J. H. Reconstruction of effective potential from statistical analysis of dynamic trajectories. AIP Adv. 10, 6 (2020). https://doi.org:10.1063/5.0006103
34 Neumayer, S. M., Saremi, S., Martin, L. W., Collins, L., Tselev, A., **Jesse**, S., Kalinin, S. V. & Balke, N. Piezoresponse amplitude and phase quantified for electromechanical characterization. J. Appl. Phys. 128, 11 (2020). https://doi.org:10.1063/5.0011631
35 Neumayer, S. M., **Jesse**, S., Velarde, G., Kholkin, A. L., Kravchenko, I., Martin, L. W., Balke, N. & Maksymovych, P. To switch or not to switch - a machine learning approach for ferroelectricity. Nanoscale Adv. 2, 2063-2072 (2020). https://doi.org:10.1039/c9na00731h
36 Neumayer, S. M., Brehm, J. A., Tao, L., O'Hara, A., Ganesh, P., **Jesse**, S., Susner, M. A., McGuire, M. A., Pantelides, S. T., Maksymovych, P. & Balke, N. Local Strain and Polarization Mapping in Ferrielectric Materials. ACS Appl. Mater. Interfaces 12, 38546-38553 (2020). https://doi.org:10.1021/acsami.0c09246
37 Lorenz, M., Wagner, R., **Jesse**, S., Marsh, J. M., Mamak, M., Proksch, R. & Ovchinnikova, O. S. Nanoscale Mass Spectrometry Multimodal Imaging via Tip-Enhanced Photothermal Desorption. ACS Nano 14, 16791-16802 (2020). https://doi.org:10.1021/acsnano.0c05019
38 Liu, Y. T., Li, M. X., Wang, M. S., Collins, L., Ievlev, A. V., **Jesse**, S., Xiao, K., Hu, B., Belianinov, A. & Ovchinnikova, O. S. Twin domains modulate light-matter interactions in metal halide perovskites. APL Mater. 8, 5 (2020). https://doi.org:10.1063/1.5127866
39 Liu, Y. T., Ievlev, A. V., Collins, L., Belianinov, A., Keum, J. K., Ahmadi, M., **Jesse**, S., Retterer, S. T., Xiao, K., Huang, J. S., Sumpter, B. C., Kalinin, S. V., Hu, B. & Ovchinnikova, O. S. Strain-Chemical Gradient and Polarization in Metal Halide Perovskites. Adv. Electron. Mater. 6, 8 (2020). https://doi.org:10.1002/aelm.201901235
40 Li, X., Dyck, O., Unocic, R. R., Ievlev, A. V., **Jesse**, S. & Kalinin, S. V. Statistical learning of governing equations of dynamics from in-situ electron microscopy imaging data. Mater. Des. 195, 11 (2020). https://doi.org:10.1016/j.matdes.2020.108973
41 Kelley, K. P., Ziatdinov, M., Collins, L., Susner, M. A., Vasudevan, R. K., Balke, N., Kalinin, S. V. & **Jesse**, S. Fast Scanning Probe Microscopy via Machine Learning: Non-Rectangular Scans with Compressed Sensing and Gaussian Process Optimization. Small 16, 6 (2020). https://doi.org:10.1002/smll.202002878
42 Kelley, K. P., Ren, Y., Morozovska, A. N., Eliseev, E. A., Ehara, Y., Funakubo, H., Giamarchi, T., Balke, N., Vasudevan, R. K., Cao, Y., **Jesse**, S. & Kalinin, S. V. Dynamic Manipulation in Piezoresponse Force Microscopy: Creating Nonequilibrium Phases with Large Electromechanical Response. ACS Nano 14, 10569-10577 (2020). https://doi.org:10.1021/acsnano.0c04601
43 Kelley, K. P., Li, L. L., Ren, Y., Ehara, Y., Funakubo, H., Somnath, S., **Jesse**, S., Cao, Y., Kannan, R., Vasudevan, R. K. & Kalinin, S. V. Tensor factorization for elucidating mechanisms of piezoresponse relaxation via dynamic Piezoresponse Force Spectroscopy. npj Comput. Mater. 6, 8 (2020). https://doi.org:10.1038/s41524-020-00384-6

44 Gao, Q., Sun, W. W., Ilani-Kashkouli, P., Tselev, A., Kent, P. R. C., Kabengi, N., Naguib, M., Alhabeb, M., Tsai, W. Y., Baddorf, A. P., Huang, J. S., **Jesse**, S., Gogotsi, Y. & Balke, N. Tracking ion intercalation into layered Ti3C2 MXene films across length scales. Energy Environ. Sci. 13, 2549-2558 (2020). https://doi.org:10.1039/d0ee01580f
45 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 161, 750-757 (2020). https://doi.org:10.1016/j.carbon.2020.01.042
46 Dyck, O., Yoon, M., Zhang, L. Z., Lupini, A. R., Swett, J. L. & **Jesse**, S. Doping of Cr in Graphene Using Electron Beam Manipulation for Functional Defect Engineering. ACS Appl. Nano Mater. 3, 10855-10863 (2020). https://doi.org:10.1021/acsanm.0c02118
47 Dyck, O., Lingerfelt, D., Kim, S., **Jesse**, S. & Kalinin, S. V. Direct matter disassembly via electron beam control: electron-beam-mediated catalytic etching of graphene by nanoparticles. Nanotechnology 31, 8 (2020). https://doi.org:10.1088/1361-6528/ab7ef8
48 Dyck, O., **Jesse**, S., Delby, N., Kalinin, S. V. & Lupini, A. R. Variable voltage electron microscopy: Toward atom-by-atom fabrication in 2D materials. Ultramicroscopy 211, 8 (2020). https://doi.org:10.1016/j.ultramic.2020.112949
49 Chakraborty, M., Ziatdinov, M., Dyck, O., **Jesse**, S., White, A. D. & Kalinin, S. V. Reconstruction of the interatomic forces from dynamic scanning transmission electron microscopy data. J. Appl. Phys. 127, 7 (2020). https://doi.org:10.1063/5.0009413
50 Celano, U., Gomez, A., Piedimonte, P., Neumayer, S., Collins, L., Popovici, M., Florent, K., McMitchell, S. R. C., Favia, P., Drijbooms, C., Bender, H., Paredis, K., Di Piazza, L., **Jesse**, S., Van Houdt, J. & van der Heide, P. Ferroelectricity in Si-Doped Hafnia: Probing Challenges in Absence of Screening Charges. Nanomaterials 10, 15 (2020). https://doi.org:10.3390/nano10081576
51 Brehm, J. A., Neumayer, S. M., Tao, L., O'Hara, A., Chyasnavichus, M., Susner, M. A., McGuire, M. A., Kalinin, S. V., **Jesse**, S., Ganesh, P., Pantelides, S. T., Maksymovych, P. & Balke, N. Tunable quadruple-well ferroelectric van der Waals crystals. Nat. Mater. 19, 43-+ (2020). https://doi.org:10.1038/s41563-019-0532-z
52 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. Sci. Adv. 5, 9 (2019). https://doi.org:10.1126/sciadv.aaw8989
53 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. Adv. Funct. Mater. 29, 8 (2019). https://doi.org:10.1002/adfm.201904480
54 Zhang, C., Dyck, O., Garfinkel, D. A., Stanford, M. G., Belianinov, A. A., Fowlkes, J. D., **Jesse**, S. & Rack, P. D. Pulsed Laser-Assisted Helium Ion Nanomachining of Monolayer Graphene-Direct-Write Kirigami Patterns. Nanomaterials 9, 11 (2019). https://doi.org:10.3390/nano9101394
55 Veenhuizen, K., McAnany, S., Vasudevan, R., Nolan, D., Aitken, B., **Jesse**, S., Kalinin, S. V., Jain, H. & Dierolf, V. Ferroelectric domain engineering of lithium niobate single crystal confined in glass. MRS Commun. 9, 334-339 (2019). https://doi.org:10.1557/mrc.2018.234
56 Schaake, J. C., Pooser, R. C., **Jesse**, S. & Ieee. in Conference on Lasers and Electro-Optics (CLEO). (Ieee, 2019).
57 Neumayer, S. M., Eliseev, E. A., Susner, M. A., Tselev, A., Rodriguez, B. J., Brehm, J. A., Pantelides, S. T., Panchapakesan, G., **Jesse**, S., Kalinin, S. V., McGuire, M. A., Morozovska, A. N., Maksymovych, P. & Balke, N. Giant negative electrostriction and dielectric tunability in a van der Waals layered ferroelectric. Phys. Rev. Mater. 3, 7 (2019). https://doi.org:10.1103/PhysRevMaterials.3.024401
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