

ANDREW B. YANKOVICH

Post-Doctoral Research Fellow

Department of Physics

Chalmers University of Technology

Email: andrew.yankovich@chalmers.se

Address: Fysikgränd 3, Gothenburg 41296, Sweden

EDUCATION

DOCTOR OF PHILOSOPHY – MATERIALS SCIENCE	May 2015
University of Wisconsin – Madison, USA	
Adviser: Professor Paul M. Voyles	
Thesis: "Quantitative Scanning Transmission Electron Microscopy of Electronic and Nanostructured Materials"	
MASTERS OF SCIENCE – MATERIALS SCIENCE	Dec. 2011
University of Wisconsin – Madison, USA	
Adviser: Professor Paul M. Voyles	
BACHELORS OF SCIENCE – MATERIALS SCIENCE AND ENGINEERING	Dec. 2008
University of Minnesota – Twin Cities, USA	
BACHELORS OF ARTS – DOUBLE MAJOR: MATHEMATICS & PHYSICS	Dec. 2005/2008
Saint John's University – Collegeville MN, USA	

WORK EXPERIENCE

POST-DOCTORAL RESEARCH SCHOLAR	June 2015 - Present
Department of Physics	
Chalmers University of Technology, Gothenburg Sweden	
Adviser: Professor Eva Olsson	
RESEARCH ASSISTANT	Aug. 2009 - May 2015
Department of Materials Science and Engineering	
University of Wisconsin – Madison, USA	
Adviser: Professor Paul M. Voyles	
MICROSCOPY CONSULTANT	2012 - 2014
Conducted advanced electron microscopy experiments and data analysis for Xolve Inc. for research and development of exfoliated graphene/polymer composite materials.	
TEACHING ASSISTANT	2013 - 2014
MSAE 748 - Structural Analysis of Materials	
Department of Materials Science and Engineering	
University of Wisconsin – Madison, USA	
UNDERGRADUATE RESEARCH ASSISTANT	2008 - 2009
Department of Materials Science and Engineering	
University of Minnesota – Twin Cities, USA	

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AWARDS, HONORS, AND GRANTS

- International Federation of Societies for Microscopy (IFSM) Young Scientists Assembly selected participant at the 19th International Microscopy Congress 2018
- Kungl. Vetenskapsakademien (The Royal Swedish Academy of Sciences) Physics Scholarship 2018
- Chalmers University Research Fund Scholarship 2016
- Chalmers University Nanoscience and Nanotechnology Area of Advance Undergraduate Activities Support Grant 2016
- Knut and Alice Wallenberg Foundation Travel Grant 2016
- David Turnbull Research Award, University of Wisconsin – Madison, Materials Science Program 2015
- Materials Research Society Silver Graduate Student Award 2014
- Microscopy Society of America (MSA) travel grant award for the 18th International Microscopy Congress 2014
- IFSM Young Scientists assembly at the 18th International Microscopy Congress (declined due to personal circumstances) 2014
- University of Wisconsin - Madison Vilas Foundation Conference Travel Grant – for 18th International Microscopy Congress. 2014
- Microscopy and Microanalysis Presidential Scholar Student Award 2013
- Dean's List at the University of Minnesota 2006 - 2008
- President's Scholarship at Saint John's University 2001 - 2005
- Ralph W. Burnet Scholarship 2001

FIRST AUTHOR PUBLICATIONS

- T. Nillson Pingel*, M. Jørgensen*, **A. B. Yankovich***, H. Grönbeck, and E. Olsson, "Influence of atomic site-specific strain on catalytic activity of supported nanoparticles", *Nature Communications*, 9:2722 (2018) *shared contribution
- **A. B. Yankovich**, R. Verre, E. Olsén, A. E. O. Persson, V. Trinh, G. Dovner, M. Käll, and E. Olsson, "Multidimensional Hybridization of Dark Surface Plasmons", *ACS Nano*, 11 (4), 4265-4274 (2017)
- **A. B. Yankovich**, T. Pingel, J. Feng, A. Kvit, T. Slater, S. Haigh, D. Morgan, P. M. Voyles, and E. Olsson, "Exposing New Atomic-scale Information about Materials by Improving the Quality and Quantifiability of Aberration-corrected STEM Data", *The 16th European Microscopy Congress*, Lyon France (2016)
- **A. B. Yankovich**, C. Zhang, A. Oh, T.J.A. Slater, F. Azough, R. Freer, S.J. Haigh, R. Willet, and P. M. Voyles, "Non-rigid registration and non-local principal component analysis to improve electron microscopy spectrum images", *Nanotechnology (Special issue on Big, Deep and Smart Data)*, 27:354001 (2016)
- **A. B. Yankovich**, B. Berkels, W. Dahmen, P. Binev, and P. M. Voyles, "High-precision scanning transmission electron microscopy at coarse pixel sampling for reduced electron dose", *Advanced Structural and Chemical Imaging*, 1:2 (2015)
- **A. B. Yankovich**, J. Feng, A. Kvit, T. Slater, S. Haigh, D. Morgan, and P. M. Voyles, "Revealing New Atomic-scale Information about Materials by Improving the Quality and Quantifiability of Aberration-corrected STEM Data", *Microscopy and Microanalysis*, 21 (S3), page 2409-2410 (2015)
- **A. B. Yankovich**, B. Berkels, W. Dahmen, P. Binev, S. I. Sanchez, S. A. Bradley, A. Li, I. Szlufarska, and P. M. Voyles, "Picometer-Precision Analysis of Scanning Transmission Electron Microscopy Images of Platinum Nanocatalysts", *Nature Communications*, 5:4155 (2014)

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- **A. B. Yankovich**, A. V. Kvit, X. Li, F. Zhang, V. Avrutin, H. Liu, N. Izyumskaya, Ü. Özgür, B. Van Leer, H. Morkoç, and P. M. Voyles, "Thickness variations and absence of lateral compositional fluctuations in aberration-corrected STEM images of InGaN LED active regions at low dose", *Microscopy and Microanalysis*, 20, 3, 864-868 (2014)
 - **A. B. Yankovich** and P. M. Voyles, "Precision Limits to STEM Imaging from Dynamical Scattering and Channeling of Sub-Angstrom Electron Probes", *Microscopy and Microanalysis*, 20 (S3) 120-121 (2014)
 - **A. B. Yankovich**, B. Berkels, W. Dahmen, R. Sharpley, P. Binev, and P. M. Voyles, "Measuring Surface Atom Bond Length Contraction in Au and Pt Nanoparticles Using High-Precision STEM Imaging", *Microscopy and Microanalysis*, 19 (S2) 1688-1689 (2013)
 - **A. B. Yankovich**, B. Puchala, W. Fei, J.-H. Seo, D. Morgan, X. Wang, Z. Ma, A. V. Kvit, and P. M. Voyles, "Stable p-type conduction from Sb-decorated head-to-head basal plane inversion domain boundaries in ZnO nanowires", *Nano Letters*, 12 (3) 1311-1316 (2012)
 - **A. B. Yankovich**, B. Puchala, F. Wang, D. Morgan, X. Wang, A. V. Kvit, and P. M. Voyles, "Head-to-head Inversion Domain Boundaries in Sb-doped p-type ZnO Nanowires", *Microscopy and Microanalysis*, 18 (S2) 316-317 (2012)
 - **A. B. Yankovich**, A. V. Kvit, H. Y. Liu, X. Li, F. Zhang, V. Avrutin, N. Izyumskaya, Ü. Özgür, H. Morkoç, and P. M. Voyles, "Pyramid nano-voids in GaN and InGaN", *SPIE OPTO*, Vol. 8262-05 (2012)
 - **A. B. Yankovich**, A. V. Kvit, X. Li, F. Zhang, V. Avrutin, H. Y. Liu, N. Izyumskaya, Ü. Özgür, H. Morkoç, and P. M. Voyles, "Absence of Lateral Composition Fluctuations in Aberration-corrected STEM Images of an InGaN Quantum Well at Low Dose", *Mater. Res. Soc. Symp. Proc.*, Vol. 1432 (2012)
 - **A. B. Yankovich**, B. Puchala, F. Wang, J.-H. Seo, D. Morgan, X. Wang, A. V. Kvit, Z. Ma, and P. M. Voyles, "p-Type Conduction in ZnO Nanowires from Sb-Decorated Head-to-Head Basal Plane Inversion Domain Boundaries", *Journal of Materials Science & Engineering*, 1:3 (2012)
 - **A. B. Yankovich**, A. V. Kvit, X. Li, F. Zhang, V. Avrutin, H. Y. Liu, N. Izyumskaya, U. Ozgur, H. Morkoç, and P. M. Voyles, "Hexagonal-Based Pyramid Void Defects in GaN and InGaN", *Journal of Applied Physics*, 111, 023517, (2011)
 - **A. B. Yankovich**, A. V. Kvit, X. Li, F. Zhang, V. Avrutin, H. Y. Liu, N. Izyumskaya, Ü. Özgür, H. Morkoç, and P. M. Voyles, "Indium Composition Variation in Nominally Uniform InGaN Layers Discovered by Aberration-Corrected Z-contrast STEM", *Microscopy and Microanalysis*, 17 (S2), 1386 (2011)
 - **A. B. Yankovich**, A. V. Kvit, X. Li, F. Zhang, V. Avrutin, H. Y. Liu, N. Izyumskaya, Ü. Özgür, H. Morkoç, and P. M. Voyles, "Vertical composition variation in nominally uniform InGaN layers revealed by aberration-corrected STEM imaging", *SPIE OPTO*, Vol. 79391E (2011)

ADDITIONAL PUBLICATIONS

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- M. Stührnberg, B. Munkhbat, D. G. Baranov, J. Cuadra, **A. B. Yankovich**, T. J. Antosiewicz, E. Olsson, and T. Shegai "Strong Light-Matter Coupling between Plasmons in Individual Gold Bi-pyramids and Excitons in Mono- and Multilayer WSe₂", *Nano Letters*, 18 (9), 5938-5945 (2018)
 - R. Verre, L. Shao, N. Odebo Länk, P. Karpinski, **A. B. Yankovich**, T. J. Antosiewicz, E. Olsson, and M. Käll, "Metasurfaces and colloidal suspensions composed of 3D chiral Si nanoresonators", *Advanced Materials*, 29 (29), 1701352 (2017)
 - R. Jacobs, B. Zheng, B. Puchala, P. M. Voyles, **A. B. Yankovich**, and D. Morgan, "Counterintuitive Reconstruction of the Polar O-Terminated ZnO Surface with Zinc Vacancies and Hydrogen", *The Journal of Physical Chemistry Letters* 7, 4483-4487 (2016)
 - C. Zhang, A. Oh, **A. B. Yankovich**, T. Slater, S. Haigh, R. Willett, and P. M. Voyles, "Combining Non-Rigid Registration with Non-Local Principle Component Analysis for Atomic Resolution EDS Mapping", *Microscopy and Microanalysis*, 22 (S3), 1406-1407 (2016)

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- M. Yu, **A. B. Yankovich**, A. Kaczarowski, D. Morgan, and P. M. Voyles, "Integrated Computational and Experimental Structure Refinement for Nanoparticles", *ACS Nano* 10 (4) 4031-4038 (2016)
 - P. Voyles, Z. Song, D. Zhou, Z. Xu, **A. B. Yankovich**, D. Morgan, "Nanoparticle Structure from Genetic Algorithm Refinement Against Quantitative STEM Data", *The 16th European Microscopy Congress, Lyon, France* (2016)
 - L. de Knoop, N. Voskanyan, **A. B. Yankovich**, K. Lodewijks, A. Dmitriev, and E. Olsson, "Structural changes of Au nanocones during in situ cold-field emission observed by high-resolution TEM", *The 16th European Microscopy Congress, Lyon, France* (2016)
 - N. Mevenkamp, P. Binev, W. Dahmen, P. M. Voyles, **A. B. Yankovich**, and B. Berkels, "Poisson Noise Removal from High Resolution STEM images based on Periodic Block Matching", *Advanced Structural and Chemical Imaging* 1:3 (2015)
 - A. V. Kvit, J. Feng, **A. B. Yankovich**, D. Morgan, and P. M. Voyles, "Increased Fluctuations of Interatomic Distances in Distorted Structure of Stoichiometric LaMnO₃", *Microscopy and Microanalysis*, 21 (S3) 2413-2414 (2015)
 - J. Feng, A. V. Kvit, **A. B. Yankovich**, C. Zhang, D. Morgan, and P. M. Voyles, "2", *Microscopy and Microanalysis*, 21 (S3) 1887-1888 (2015)
 - N. Mevenkamp, **A. B. Yankovich**, P. M. Voyles and B. Berkels, "Non-local Means for Scanning Transmission Electron Microscopy Images and Poisson Noise based on Adaptive Periodic Similarity Search and patch Regularization", *Vision, Modeling, and Visualization*, 63-70 (2014)
 - N. Mevenkamp, R. Bergmann, B. Berkels, W. Dahmen, J. Mayer, P. M. Voyles, **A. B. Yankovich**, "Non-local Means based Denoising and Reconstruction of STEM Images", *Banff International Research Station for Mathematical Innovation and Discovery* (5/22/2015)
 - H. Y. Liu, N. Izyumskaya, V. Avrutin, Ü. Özgür, **A. B. Yankovich**, A. V. Kvit, P. M. Voyles, and H. Morkoç, "Donor Behavior of Sb in ZnO", *Journal of Applied Physics*, 112(3), 033706 (2012)
 - H. Y. Liu, V. Avrutin, N. Izyumskaya, Ü. Özgür, **A. B. Yankovich**, A. V. Kvit, and P. M. Voyles, H. Morkoç, "Electron scattering mechanisms in GZO films grown on a-sapphire substrates by plasma-enhanced molecular beam epitaxy", *Journal of Applied Physics*, 111, 103713 (2012)
 - A. V. Kvit, **A. B. Yankovich**, V. Avrutin, H. Liu, N. Izyumskaya, U. Ozgur, H. Morkoç, and P. M. Voyles, "Impurity Distribution and Microstructure of Ga-doped ZnO Films Grown by Molecular Beam Epitaxy", *Journal of Applied Physics*, 112, 123527 (2012)
 - H. Y. Liu, X. Li, F. Zhang, V. Avrutin, N. Izyumskaya, Ü. Özgür, **A. B. Yankovich**, A. V. Kvit, P. M. Voyles, and H. Morkoc, "Electrical properties of ZnO:Ga as a transparent conducting oxide in InGaN based light emitting diodes", *SPIE OPTO*, Vol. 8262-26 (2012)
 - B. Berkels, **A. B. Yankovich**, F. Shi, P. M. Voyles, W. Dahmen, R. Sharpley, P. Binev, "High Precision STEM Imaging by Non-Rigid Alignment and Averaging of a Series of Short Exposures", *Microscopy and Microanalysis*, 18 (S2) 300-301 (2012)
 - A. V. Kvit, **A. B. Yankovich**, B. T. Puchala, D. D. Morgan, P. M. Voyles, V. Avrutin, H. Liu, N. Izyumskaya, U. Özgür and H. Morkoç, "Structural and Elemental Analysis of Heavily- Doped ZnO", *Microscopy and Microanalysis*, 18 (S2) 392-393 (2012)
 - F. Wang, J.H. Seo, **A. B. Yankovich**, J. Shi, P. M. Voyles, Z. Ma, and X. Wang, "Sb-doped p-type ZnO nanowires: Solution synthesis, defects study, and device fabrication", *Abstracts of Papers of the American Chemical Society*, 244 (2012)
 - H. Y. Liu, X. Li, S. Liu, X. Ni, M. Wu, V. Avrutin, N. Izyumskaya, Ü. Özgür, **A. B. Yankovich**, A. V. Kvit, P. M. Voyles, and H. Morkoç, "InGaN based light emitting diodes utilizing Ga doped ZnO as a highly transparent contact to p-GaN", *Physica Status Solidi (C)*, 8, 1548-1551 (2011)

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- H. Y. Liu, X. Li, S. Liu, X. Ni, V. Avrutin, N. Izyumskaya, Ü. Özgür, **A. B. Yankovich**, A. V. Kvit, P. M. Voyles, M. A. Reshchikov, and H. Morkoc, "Optimization of ZnO:Ga properties for application as a transparent conducting oxide in InGaN based light emitting diodes", *SPIE OPTO*, Vol. 7939, 10, 79392E (2011)
 - H. Y. Liu, V. Avrutin, N. Izyumskaya, M. A. Reshchikov, S. Wolgast, C. Kurdak, **A. B. Yankovich**, A. V. Kvit, P. M. Voyles, Ü. Özgür, and H. Morkoc, "Effect of Growth Conditions on Electronic and Structural Properties of GZO Films Grown by Plasma-enhanced Molecular Beam Epitaxy on p-GaN(0001)/Sapphire Templates", *Mater. Res. Soc. Symp. Proc.*, Vol. 1315 (2011)

INVITED PRESENTATIONS

- **Microscopy and Microanalysis (2018)**, Baltimore MD. "Extracting Local Quantitative Atomic-resolution Strain Information from High-precision STEM data of Supported Nanocatalysts"
- **Stanford Chalmers Workshop on Advancing Materials Innovatively (2017)**, Gothenburg Sweden. "Measuring the atomic structure of metallic nanoparticles with picometre precision and surface plasmon hybridization using quantitative scanning transmission electron microscopy"
- **Banff International Research Station: Mathematical Advances in Electron Microscopy (2017)**, Oaxaca Mexico. "Exposing new atomic-scale information about nanomaterials by improving the quality and quantifiability of aberration-corrected STEM data"
- **European Microscopy Congress (2016)**, Lyon France. "Exposing New Atomic-scale Information about Materials by Improving the Quality and Quantifiability of Aberration-corrected STEM Data"
- **Microscopy and Microanalysis (2015)**, Portland OR. "Revealing New Atomic-scale Information about Materials by Improving the Quality and Quantifiability of Aberration-corrected STEM Data"
- **University of California Santa Barbara – Materials Department (2014)**
- **Brookhaven National Laboratory – Upton New York USA (2014)**
- **Pacific Northwest National Laboratory – Richland WA USA (2014)**
- **Pre-meeting congress on opportunities, artifacts, and interpretation of aberration-corrected electron microscopy data, Microscopy and Microanalysis (2014)**, Hartford CT "Picometer-precision analysis of scanning transmission electron microscopy images"
- **Banff International Research Station: Imaging and Modeling in Electron Microscopy and Mathematics (2014)**, Banff Canada. "Applications of non-rigid registration for enhanced signal to noise ratio, spatial precision, and standardless atom counting in STEM images"
- **OMICS Group Conferences: International Conference and Expo on Materials Science & Engineering (2012)**, Chicago IL. "p-Type Conduction in ZnO Nanowires from Sb-Decorated Head-to-Head Basal Plane Inversion Domain Boundaries"

ADDITIONAL PRESENTATIONS

- **University of Tokyo - Chalmers University of Technology Workshop on Advanced Materials and Transmission Electron Microscopy (2017)**, Tokyo Japan, "Revealing new information about nanomaterials by improving the quality of STEM HAADF, EDS, and EELS data"
- **Electron Beam Spectroscopy for Nanophotonics (2017)**, Sitges Spain, "Measuring dark surface plasmon hybridization using STEM EELS" (poster)
- **International Workshop on Frontiers of Electron Tomography (2017)**, Berkeley CA USA, "Measuring strain in nanoparticles using high precision STEM imaging" (poster)
- **Gordon Research Conference: Plasmonics and Nanophotonics (2016)**, Sunday River ME, "Coupling and Hybridization of Au Nanostructure Plasmons" (poster)

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- **International Microscopy Congress (2014)**, Prague Czech Republic, "Measuring atomic surface structures in Pt and Au nanocatalysts with high precision STEM imaging"
 - **Microscopy and Microanalysis (2014)**, Hartford CT, "Precision Limits to STEM Imaging from Dynamical Scattering and Channeling of Sub-Angstrom Electron Probes" (poster)
 - **Materials Research Society Spring Meeting (2014)**, San Francisco CA, "High precision STEM imaging of Pt and Au nanocatalysts"
 - **Microscopy and Microanalysis (2013)**, Indianapolis IN, "Measuring Surface Atom Bond Length Contraction in Au and Pt Nanoparticles Using High-Precision STEM Imaging"
 - **Gordon Research Conference: Defects in Semiconductors (2012)**, Biddeford ME, University of New England, "p-Type Conduction in ZnO Nanowires from Sb-Decorated Head-to-Head Basal Plane Inversion Domain Boundaries" (poster)
 - **Microscopy and Microanalysis (2012)**, Phoenix AZ, "High Precision STEM Imaging by Non-Rigid Alignment and Averaging of a Series of Short Exposures"
 - **SPIE Photonics West (2012)**, San Francisco CA, "Pyramid nano-voids in GaN and InGaN"
 - **Microscopy and Microanalysis (2011)**, Nashville TN, "Indium Composition Variation in Nominally Uniform InGaN Layers Discovered by Aberration-Corrected Z-contrast STEM"

CONTRIBUTED LECTURES

- Chalmers University Soft Electron Microscopy School, July 18-20, 2015.
 - Introduction to Scanning Transmission Electron Microscopy
 - Introduction to Energy Dispersive X-ray Spectroscopy (EDX) and Electron Energy Loss Spectroscopy (EELS)

ATTENDED ELECTRON MICROSCOPY SCHOOLS

- GIF School - Europe, Graz University - Gatan Inc., Graz Austria (Feb. 2017).
- EELS and EFTEM Analysis Training School, Gatan Inc., Pleasanton CA USA (Oct. 2015).
- The Canadian Center for Electron Microscopy's summer school on aberration-corrected electron microscopy, McMaster University, Hamilton, ON Canada (2010).

STUDENT ADVISING EXPERIENCE

- Master Thesis Co-Advisor: Chalmers University (Spring 2018) Erik Olsén, Gustav Persson.
- Bachelor Thesis Co-Advisor: Chalmers University (Spring 2016) Erik Olsén, Anton Persson, Viet Trihn, Gudrun Dovner.

PROFESSIONAL SOCIETIES

- Materials Research Society
- Microscopy Society of America
- Microbeam Analysis Society
- Midwest Microscopy and Microanalysis Society

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ORGANIZATIONAL DUTIES

- Organizing committee member for the Advanced InSitu TEM/STEM Workshop at Chalmers University of Technology, July 20-23, 2015.
- Creating and maintaining the Eva Olsson Group website: <http://www.evaolssongroup.com>