Neil R. Voss

Address: Mail drop: SCH 600, 1400 N. Roosevelt Blvd., Schaumburg, IL 60173
Contact Info: *work: (847) 619-7966, email: nvoss@roosevelt.edu*

CURRENT POSITION

Associate Professor of Biology   Roosevelt University   Aug. 2016 – *present*

EDUCATION

Yale University   *New Haven, CT*   2000 – 2007
- Graduate research with Professors Peter B. Moore and Thomas A. Steitz.
- Ph.D. in Molecular Biophysics and Biochemistry, 2007.
- Thesis: "*Geometric Studies of RNA and Ribosomes, and Ribosome Crystallization.*"

Iowa State University   *Ames, IA*   1996 – 2000
- Undergraduate research with Professor Michael C. Tringides.
- B.S. in Physics with Distinction and Honors, 2000.
- B.S. in Mathematics with Distinction, 1999.

RESEARCH INTERESTS

My research focuses on the structures of large biological macromolecules – from the beautiful symmetry of viruses to the incredibly complex shape of ribosomes – and the computational tools used to create and analyze them. To this end, my research involves three separate branches: (1) Advancing techniques and computational tools used in 3D electron microscopy; my recent focus has been on the contrast transfer function. (2) Developing novel computational methods, geometric tools, and inexpensive 3D printing to analyze existing structures. (3) Discovery-based science built upon student structural projects in both bacteriophage isolation and ribosome purification from novel species.

RESEARCH APPOINTMENTS

Michigan University and San Diego Super Computing Center   May 2020 – *present*
- Collaboration with Michael Cianfrocco, Assistant Professor of Biological Chemistry
- From the grant: NSF Collaborative Research: ABI Development: Building a Community Gateway for Cryo-Electron Microscopy Structure Determination (July 2018-2022) award
- Assist with user training, outreach, testing, and computation problems.

Northwestern University Collaboration   Jan. 2016 – *present*
- Collaboration with Yuan He, Director of the NU Electron Microscopy Core Facility.
- Collaboration with Alfonso Mondragon, Former Director of the NU Electron Microscopy Core Facility
- Assist with technical and computation problems.

New York Structural Biology Center Consultant   Jan. 2016 – May 2019
- Collaboration with Bridget Carragher and Clint Potter.

Assistant Professor of Biology at Roosevelt University   Aug. 2010 – Aug. 2016

Northwestern University Visiting Scholar   May 2014 – Dec 2015
- Collaboration with Vinzenz Unger, Former Director of the NU Electron Microscopy Core Facility.
- Implemented Leginon automated data collection on JEOL electron microscopes and Gatan imaging devices.

Scripps Research Post-doctoral Associate   Dec. 2006 – Aug. 2010
- Advisors, Bridget Carragher and Clint Potter.
- Learned the fundamentals of high resolution imaging in electron microscopy.
- Developed new technologies for solving structures of unknown particles using image tilt pairs.

Yale University Graduate Student   Sept. 2000 – Nov. 2006
- Advisors, Prof. Peter Moore & Prof. Thomas Steitz.
- Investigated higher eukaryotic ribosomal purification and crystallization.
- Developed computational geometry software for analyzing the exit tunnel of the ribosome.

Ames Laboratory Research Assistant   Mar. 1997 – Aug. 2000
- Advisor, Prof. Michael C. Tringides, Iowa State University.
- Analyzed data from STM and SPA-LEED experiments to analyze diffusion properties of atoms.
- Developed data processing techniques and high-throughput software implementing them.

Ames Laboratory Research Assistant   May 2000 – Aug. 2000
- Advisors, Dr. Jaime Morris and Prof. Kai-Ming Ho, Iowa State University.
- Developed software to align proteins for CASP4 protein structure prediction contest.

Rice University Keck Fellow   May 1999 – Aug. 1999
- Advisor, Prof. George Fox, University of Houston.
- Created a database of non-canonical base pair formations in RNA.

Ames Laboratory Research Assistant   Jan. 1997 – Mar. 1997
- Advisor, Prof. Stefan Zollner, Iowa State University.
- Analyzed data from elliptical reflections to assess optical properties and band structure of semi-conductors
- Used programming to fit data to complex equations

TEACHING EXPERIENCE

Teaching load: 2010-2016: six courses per year; Spring 2017-Spring 2021: seven courses per year; nine contact hours per week. 17 different courses. † – denotes new course preparation for that semester.

Fall 2022
- BIOL 480-01/480-20, Applications of Biotechnology (remote)
- BCHM 355/455-20, Biochemistry Lecture (remote)
- BIOL 351/451-24, Genetics Lecture (remote/video-conferenced)

Spring 2022
- BIOL 301-20A, Cellular and Molecular Biology Lecture (hybrid remote)
- BIOL 301-20B, Cellular and Molecular Biology Lab (hybrid face-to-face/remote)
- † BIOL 383/483-10/24 Special Topics: Biology and Ethics in Film (remote)

Fall 2021
- BIOL 480-01/480-20, Applications of Biotechnology (remote)
- BCHM 355/455-20, Biochemistry Lecture (face-to-face)
- BIOL 351/451-10/24, Genetics Lecture (remote)
- † BIOL 453-10, Molecular Biology Lecture (remote)

Spring 2021
- BIOL 301-20A, Cellular and Molecular Biology Lecture (remote)
- BIOL 301-20B, Cellular and Molecular Biology Lab (hybrid face-to-face/remote)
- BCHM 357/457-20, Advanced Biochemistry Lecture (remote)

Fall 2020 – Full Remote
- BIOL 480-01/480-20, Applications of Biotechnology (remote)
- BCHM 355/455-20, Biochemistry Lecture (remote)
- BIOL 351/451-24, Genetics Lecture (remote)

Spring 2020 – COVID Adapted
- BIOL 301-20A, Cellular and Molecular Biology Lecture (converted to remote)
- BIOL 301-20B, Cellular and Molecular Biology Lab (converted to remote)
- † BIOL 383/483-01 and 383/483-20, Special Topics: Medical Devices (video-conferenced/remote)

Fall 2019
- BIOL 480-01/480-20, Applications of Biotechnology (video-conferenced)
- BCHM 355/455-20, Biochemistry Lecture (face-to-face)
- BIOL 351/451-10, Genetics Lecture (face-to-face)
- BIOL 351/451-24, Genetics Lecture (face-to-face)

Spring 2019
- BIOL 301-20A, Cellular and Molecular Biology Lecture (face-to-face)
- BIOL 301-20B, Cellular and Molecular Biology Lab (face-to-face)
- BCHM 357/457-01, Advanced Biochemistry Lecture (face-to-face)
- BCHM 357/457-20, Advanced Biochemistry Lecture (face-to-face)

Fall 2018
- BIOL 480-10/480-24, Applications of Biotechnology (video-conferenced)
- BCHM 355/455-20, Biochemistry Lecture (face-to-face)
- BIOL 351/451-01/20, Genetics Lecture (video-conferenced)

Spring 2018
- BIOL 301-20A, Cellular and Molecular Biology Lecture (face-to-face)
- BIOL 301-20B, Cellular and Molecular Biology Lab (face-to-face)
- BCHM 355/455-20, Biochemistry Lecture (face-to-face)
- BIOL 361/461-20, Information Technology for the Sciences (face-to-face)

Fall 2017
- BIOL 480-10/480-24, Applications of Biotechnology (video-conferenced)
- BCHM 357/457-10, Advanced Biochemistry Lecture (face-to-face)
- BIOL 351/451-01/20, Genetics Lecture (video-conferenced)

Spring 2017
- BIOL 301-20A, Cellular and Molecular Biology Lecture (face-to-face)
- BIOL 301-20B, Cellular and Molecular Biology Lab (face-to-face)
- BCHM 355/455-20, Biochemistry Lecture (face-to-face)
- *Course buy-out*

Fall 2016
- BIOL 480-10, Application of Biotechnology (video-conferenced)
- † BIOL 361/461-24, Information Technology for the Sciences
- † BIOL 351/451-20, Genetics Lecture

Spring 2016
- BIOL 301-20B, Cellular and Molecular Biology Lab
- BIOL 301-20A, Cellular and Molecular Biology Lecture
- *Course buy-out*

Fall 2015
- † BIOL 480-10, Application of Biotechnology (video-conferenced)
- BIOL 364/464-24, Protein Structure Determination

- † BIOL 202-20, Ecology, Evolution, and Genetics Lecture

Spring 2015
- BCHM 357/457-10, Advanced Biochemistry Lecture
- BCHM 393/493-10, Biochemistry Seminar
- BIOL 301-20B, Cellular and Molecular Biology Lab
- BIOL 301-20A, Cellular and Molecular Biology Lecture

Spring 2014
- BCHM 357/457-10, Advanced Biochemistry Lecture
- † BCHM 393/493-10, Biochemistry Seminar
- BIOL 301-20B, Cellular and Molecular Biology Lab
- BIOL 301-20A, Cellular and Molecular Biology Lecture

Fall 2013
- BCHM 354/454-01, Biochemistry Lab
- BCHM 355-01, Biochemistry Lecture
- † BIOL 364/464-24, Protein Structure Determination

Spring 2013
- BCHM 357/457-10, Advanced Biochemistry Lecture
- BIOL 301-20, Cellular and Molecular Biology Lab
- BIOL 301-20, Cellular and Molecular Biology Lecture

Fall 2012
- BCHM 355-01, Biochemistry Lecture
- † BIOL 468-20, Research Methods
- † PHYS 202-20, Intro to Algebra-based Physics II Lecture
- † PHYS 202-20, Intro to Algebra-based Physics II Lab

Spring 2012
- BIOL 301-20, Cellular and Molecular Biology Lecture
- BIOL 301-20, Cellular and Molecular Biology Lab

Fall 2011
- † BCHM 354/454-01, Biochemistry Lab
- † BCHM 355-01, Biochemistry Lecture
- BIOL 111-01, Human Biology Lecture
- BIOL 111-01, Human Biology Lab

Spring 2011
- † BCHM 457-01, Advanced Biochemistry Lecture
- † BIOL 301-10, Cellular and Molecular Biology Lecture
- † BIOL 301-10, Cellular and Molecular Biology Lab

Fall 2010
- † BIOL 111-01, Human Biology Lecture
- † BIOL 111-01, Human Biology Lab

Teaching Assistantships Prior to Faculty Appointment
- Spring 2004: X-ray Crystallography (MB&B 701B3) Graduate Recitation Teaching Assistant
- Spring 2003: X-ray Crystallography (MB&B 701B3) Graduate Recitation Teaching Assistant

- Spring 2002: X-ray Crystallography (MB&B 701B3) Graduate Recitation Teaching Assistant
- Fall 2001: Biochemistry Lab (MB&B 251La) Graduate Lab Teaching Assistant
- Summer 2000: Physics Recitation and Lab Teaching Assistant
- Spring 2000: Physics Recitation and Lab Teaching Assistant
- Fall 1999: Physics Recitation and Lab Teaching Assistant

FACULTY SERVICE

Advising Responsibilities
- 2011/2012 Academic year: 14 students
- 2012/2013 Academic year: 35 students
- 2013/2014 Academic year: 38 students
- 2014/2015 Academic year: 12 students (research leave)
- 2015/2016 Academic year: 40 students
- 2016/2017 Academic year: 20 students
- 2017/2018 Academic year: 15 students
- 2018/2019 Academic year: 11 students
- 2019/2020 Academic year: 20 students
- 2020/2021 Academic year: 20 students
- 2021/2022 Academic year: 27 students (so far)

Faculty Search Committees
- Member, NTT Professor of Biochemistry Search Committee (2017), cancelled
- Member, Assistant Professor of Ecology & Genetics Search Committee (2015–2016), successful hire
- Member, Assistant Professor of Biochemistry Search Committee (2014–2015), successful hire
- Chair, Assistant Professor of Physics Search Committee (2013–2014), successful hire
- Chair, Visiting Professor of Physics Search Committee (2012–2013), successful hire

Master's Thesis Advisor
- Bao Tran, "Investigation of Ribonuclease Degradation Activity During Purification of Artemia Brine Shrimp Ribosome" (2019)
- Amar Kumar, "Isolation, Purification, and Microscopy of Artemia Ribosomes" (2016)

Master's Thesis Committees
- Aloysius Nootens, "Analysis of Double Budding *S. cerevisiae* in Different Nutritional Media" (2016)
- Sheba Prasad, "Inhibitive Effects of Antioxidant EGCG on Pancreatic Cancer" (2016)
- Debbie Eng, "Detection and Comparison of Healthcare-Associated Bacterial Pathogens on Potential Dry Fomites in Hospital and Community Massage Therapy Settings" (2015)
- Angela Piotrowski, "Observational Record of Double Budding in Wild Type *S. cerevisiae*" (2014)

Event Organizer
- Science Career Day (Spring 2019)
- Math and Science Research Symposium Coordinator (Spring 2012)
- Schaumburg Student Meet and Greet (Fall 2012)

Committee and Event Service
- Schaumburg Natural Science Club, lead faculty advisor, (Fall 2016 – Spring 2020)
- Illinois Articulation Initiative (IAI) Major Biology, Representative, (Fall 2012 – *present*)
- Math and Science Resource Center Committee, Member (Spring 2012 – *present*)
- Junior & Senior Visit Day, Chicago (Fall 2015)
- Math and Science Research Symposium Liquid Nitrogen Ice Cream Demonstration (Spring 2014, 2015, and 2017)
- University Senator (Fall 2012 – Spring 2014)

- Graduate Student Orientation (Jan 2012)
- Open House Representative (Apr 2011, Nov 2011, Mar 2012, Apr 2012, Oct 2012, Apr 2013)

Manuscript Reviewer
- 1 completed assignment, Journal of Applied Crystallography (1 in 2021)
- 17 completed assignments, Journal of Structural Biology, Elsevier (3 in 2016, 4 in 2015, 3 in 2014, 2 in 2013, 4 in 2012, 1 in 2009, and 1 in 2008)
- 2 completed assignments, Transactions on Computational Biology and Bioinformatics, IEEE/ACM (1 in 2015, and 1 in 2014)

Fellowship and Grant Reviewer
- 2016 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) panelist

Other service
- Department Website Developer (Fall 2010 – present)
- Fact Sheet (B.S., Biochemistry)

Professional Memberships
- Biophysical Society (2011 – 2016), *http://www.biophysics.org/*

SOFTWARE DEVELOPMENT AND SUPPORT

GitHub account: *https://github.com/vosslab*

Primary/Sole Maintainer
- libproteingeometry: Library for Protein Geometry
  Tools for calculating Voronoi volume of atomic structures.
  http://geometry.molmovdb.org

- 3v: Voss Volume Voxelator
  Programs for the assessment of protein volumes using the rolling probe method.
  http://3vee.molmovdb.org

- TiltPicker
  Tool for picking particles from image tilt pairs for random conical tilt (RCT).
  http://emg.nysbc.org/redmine/projects/software/wiki/TiltPicker

- DoG picker
  Particle picker that uses difference of Gaussians (DoG) for picking particles.
  http://emg.nysbc.org/redmine/projects/software/wiki/DoGpicker

- FindEM v1.0
  Original fast local correlation function (FLCF) template particle picker.
  http://emg.nysbc.org/redmine/projects/software/wiki/FindEM

- CTF Eval
  Contrast transfer function (CTF) Evaluation software for 3D Electron Microscopy.
  https://github.com/vossman/ctfeval

- ACE2
  A CTF Estimator (ACE) 2 with robust astigmatism estimation and CTF correction.
  http://emg.nysbc.org/redmine/projects/software/wiki/ACE2

Team Maintainer

Appion

A pipeline for processing and analysis of EM images.
https://appion.org

Leginon

System designed for automated collection of images from a transmission electron microscope.
https://leginon.org

Contributor
- LibreOffice Suite, https://www.libreoffice.org/
- Firefox Web Browser, https://www.mozilla.org/en-US/firefox/

RESEARCH SUPERVISION

Department consists of primarily undergraduates along with a master's program in both Biotechnology and Biology.

Master's Thesis Students
- Greg Gillespie (Fall 2021 – present)
- Richard Helmuth (Spring 2019 – Spring 2021), did not finish
- Bao Tran (Fall 2018 – Summer 2019)
- Amar Kumar (Spring 2015 – Summer 2016)
- Kayla Fouch (Spring 2014 – Spring 2017), did not finish

2022: 1 continued student
- Gregory Gillespie, master's

2021: 1 new student
- Gregory Gillespie, master's

2020: 2 new students, 1 continued
- Richard Helmuth, master's
- Samantha McCarragher, undergrad
- Irena Mehic, undergrad

2019: 3 new students, 1 continued
- Bao Tran, master's
- Claudia Malekismail, undergrad
- Irena Mehic, undergrad
- Ankita Patel, master's

2018: 1 new student
- Bao Tran, master's

2016: 2 new students, 3 continued
- Kayla Fouch, master's
- Aisha Shajee, undergrad
- Amar Kumar, master's
- Ashley Anderson, master's
- Viral Patel, undergrad

2015: 6 new students, 2 continued
- Kayla Fouch, master's
- Dan Lim, undergrad NSF STEP
- Amar Kumar, master's
- Veda Patel, undergrad
- Aisha Shajee, undergrad
- Jeff Johnson, undergrad

- Amarjeet Flora, master's
- Parth Patel, undergrad

2014: 5 new students, 4 continued
- Kayla Fouch, master's
- Joel Bogolub, undergrad
- Ryan Dalton, undergrad NSF STEP
- Shail Patwari, undergrad
- Mohammed Tofa, master's
- Veda Patel, undergrad
- Sandy Mousheh, undergrad NSF STEP
- Angela Piotrowski, master's
- Lisa Sheth, master's

2013: 7 new students, 5 continued
- Kayla Fouch, master's
- Angela Piotrowski, master's
- Vikram Sharma, undergrad
- Fatima Ali, undergrad
- Qurat–ul–ain "Annie" Nasir, undergrad
- Nnenna Nwogu, master's
- Lisa Sheth, master's
- Shail Patwari, undergrad
- Orlando Lagunas, undergrad
- Sejalbin Patel, undergrad
- Mehvish Ali-Nasar, undergrad
- Maria Lazzara, master's

2012: 7 new students, 1 continued
- Syed "Hassan" Ali, undergrad
- William Wysocki, master's
- Nnenna Nwogu, master's
- Arjun Bose, high school
- Lisa Sheth, master's
- Sejalbin Patel, undergrad
- Qurat–ul–ain "Annie" Nasir, undergrad NSF STEP
- Mehvish Ali-Nasar, undergrad

2011: 5 new students
- Syed "Hassan" Ali, undergrad
- Samuel Shenker, undergrad NSF STEP
- Emma Turkson, BRIDGES/Elgin Comm. College
- Shazia Sarwar, undergrad
- Jennifer Campos, BRIDGES/Elgin Comm. College

HONORS

- Phi Kappa Phi Honor Society Member (Top 5% of university)
- Golden Key Nat. Honor Society Member (Top 15% of university)
- Outstanding Senior in Mathematics (Top student in the department, 1998-1999)
- Pi Mu Epsilon Top PUTNAM Score Award Winner (1998 and 1997)
- Mathematical Contest in Modeling (Honorable Mention, 1999; Successful Part., 1998)
- Iowa Mathematics Competition (2nd place, 1998, 4th place 1999)
- American High School Mathematics Exam Honor Roll (1995)
- Outstanding First-Year Teaching Award (1999-2000)
- Collin's Scholarship Winner (1999, award in undergraduate research)
- General Award for Superior Academic Performance in Physics (1996-97 & 1997-98)

GRANTS AND FELLOWSHIPS

- National Science Foundation: Collaborative Research: ABI Development: Building a Community Gateway for Cryo-Electron Microscopy Structure Determination (July 2018-2022) award: $26,244
  - https://nsf.gov/awardsearch/showAward?AWD_ID=1759735
- Max Goldenberg Foundation, "Sucrose Gradient Centrifugation System for Biochemistry Research and Education", 2015, $24,981
- Faculty Research and Professional Improvement Leave (Fall semester, 2014)
- National Science Foundation's Science Talent Expansion Program (NSF-STEP) internal summer research award. Multiple years: 2011: $500; 2012: $500; 2014: $1000; 2015: $500
- Consortium PI on "CryoEM studies of a critical GroEL-GroES-polypeptide intermediate,"

- Miller Graduate Student Fellowship Winner (Fall 2000; $20,000 spread over 4 years)

PUBLICATIONS

Published 23 articles in all peer-reviewed scientific journals. In total, the publications have 1696 citations yielding an h-index of 15 (Web of Science Core Collection, November 9, 2015; http://www.researcherid.com/rid/K-6244-2012). List of peer-reviewed publications is below. Using the MEDLINE/PubMed citation format.

Peer-Reviewed Publications

Fouch K, Piotrowski A, Sharma V, and Voss NR *(to be published exclusively with Roosevelt students)*
> Inexpensive 3D Models to Enhance Understanding of Protein Structure.
> Biochem Mol Biol Edu. 2019 (*in preparation*)

Geary C, Chworos A, Verzemnieks E, Voss NR, Jaeger L.
> Composing RNA Nanostructures from a Syntax of RNA Structural Modules.
> Nano Lett. 2017; 17(11):7095-7101. doi: 10.1021/acs.nanolett.7b03842. PMID: 29039189.

Sherman MB, Kakani K, Rochon D, Jiang W, Voss NR, Smith TJ.
> Stability of Cucumber Necrosis Virus at the Quasi-6-Fold Axis Affects Zoospore Transmission.
> J Virol. 2017; 91(19). pii: e01030-17. doi: 10.1128/JVI.01030-17. PMID: 28724762; PMCID: PMC5599764.

Geary C, Chworos A, Verzemnieks E, Voss NR, Jaeger L.
> Composing RNA Nanostructures from a Syntax of RNA Structural Modules.
> Nano Lett. 2017 Nov 8;17(11):7095-7101. DOI: 10.1021/acs.nanolett.7b03842.

Sherman MB, Kakani K, Rochon D, Jiang W, Voss NR, Smith TJ.
> Stability of Cucumber Necrosis Virus at the Quasi-6-Fold Axis Affects Zoospore Transmission.
> J Virol. 2017 Sep 12;91(19). pii: e01030-17. DOI: 10.1128/JVI.01030-17.

Sheth LK, Piotrowski AL, Voss NR. *(published exclusively with Roosevelt students)*
> Visualization and Quality Assessment of the Contrast Transfer Function Estimation.
> J Struct Biol. 2015;192(2):222–34. DOI: *10.1016/j.jsb.2015.06.012*

Marabini R, Carragher B, Chen S, et al. (with two Roosevelt students: Piotrowski AL and Patwari S)
> CTF Challenge: Result summary.
> J Struct Biol. 2015;190(3):348-59. DOI: *10.1016/j.jsb.2015.04.003*

Fiedler JD, Higginson C, Hovlid ML, *et al.*, Voss NR, Potter CS, Carragher B, Finn MG.
> Engineered mutations change the structure and stability of a virus-like particle.
> Biomacromolecules. 2012;13(8):2339-48. DOI: *10.1021/bm300590x*

Gibbons BJ, Brignole EJ, Azubel M, Murakami K, Voss NR, Bushnell DA, Asturias FJ, Kornberg RD.
> Subunit architecture of general transcription factor TFIIH.
> Proc Natl Acad Sci USA. 2012;109(6):1949-54. DOI: *10.1073/pnas.1105266109*

Severcan I, Geary C, Chworos A, Voss N, Jacovetty E, Jaeger L.
> A polyhedron made of tRNAs.
> Nat Chem. 2010 Sep;2(9):772-9.

Afonin KA, Bindewald E, Yaghoubian AJ, Voss N, Jacovetty E, Shapiro BA, Jaeger L.
> *In vitro* assembly of cubic RNA-based scaffolds designed *in silico*.
> Nat Nanotechnol. 2010 Sep;5(9):676-82. doi: 10.1038/nnano.2010.160.

Voss NR, Gerstein M.
> 3V: cavity, channel and cleft volume calculator and extractor.
> Nucleic Acids Res. 2010 Jul;38(Web Server issue):W555-62.

Banerjee D, Liu AP, Voss NR, Schmid SL, Finn MG.
   Multivalent display and receptor-mediated endocytosis of transferrin on virus-like particles.
   Chembiochem. 2010 Jun 14;11(9):1273-9.

Katpally U, Voss NR, Cavazza T, Taube S, Rubin JR, *et al.,* Virgin HW 4th, Wobus CE, Smith TJ.
   High-resolution cryo-electron microscopy structures of murine norovirus 1 and rabbit hemorrhagic disease virus reveal marked flexibility in the receptor binding domains.
   J Virol. 2010 Jun;84(11):5836-41.

Voss NR, Lyumkis D, Cheng A, Lau PW, *et al.,* Yoshioka C, Carragher B, Potter CS.
   A toolbox for *ab initio* 3D reconstructions in single-particle electron microscopy.
   J Struct Biol. 2010 Mar;169(3):389-98.

Voss NR, Potter CS, Smith R, Carragher B.
   Software tools for molecular microscopy: an open-text Wikibook.
   Methods Enzymol. 2010;482:381-92

Lyumkis D, Moeller A, Cheng A, Herold A, *et al.,* Quispe JD, Voss NR, Potter CS, Carragher B.
   Automation in single-particle electron microscopy: connecting the pieces.
   Methods Enzymol. 2010;483:291-338. doi:10.1016/S0076-6879(10)83015-0

NR Voss*, CK Yoshioka*, M Radermacher, CS Potter, B Carragher
   DoG Picker and TiltPicker: tools to facilitate particle selection in single particle electron microscopy.
   J Struct. Biol. v166(2): 2009, pp205-13.

GC Lander, SM Stagg, NR Voss, A Cheng, *et al.,* CS Potter, B Carragher
   Appion: an integrated, database-driven pipeline to facilitate EM image processing.
   J Struct. Biol. v166(1): 2009, pp95-102.

SM Stagg, GC Lander, J Quispe, NR Voss, A Cheng, H Bradlow, S Bradlow, B Carragher, CS Potter.
   A test-bed for optimizing high-resolution single particle reconstructions.
   J Struct. Biol. v163(1): 2008, pp 29-39.

NR Voss, MB Gerstein, TA Steitz, PB Moore
   The geometry of the ribosomal polypeptide exit tunnel.
   J Mol. Biol. v360(4): 2006, pp 893-906.

NR Voss, MB Gerstein
   Calculation of standard atomic volumes for RNA and comparison with proteins: RNA is packed more tightly.
   J Mol. Biol. v346(2): 2005, pp 477-492.

M Kammler, MH von Hogen, NR Voss, MC Tringides, A Menzel, EH Conrad
   Si(001) step dynamics: A temporal low-energy electron diffraction study.
   Phys. Rev. B. v65(7): 2002, article #075312.

J Tsai, NR Voss, MB Gerstein
   Determining the minimum number of types necessary to represent the sizes of protein atoms.
   Bioinformatics. v17(10): 2001. pp 949-956.

U Nagaswamy, NR Voss, Z Zhang, GE Fox
   Database of non-canonical base pairs found in known RNA structures.
   Nucl. Acids Res. v28(1): 2000, pp 375-376.

KE Junge, NR Voss, R Lange, JM Dolan, S Zollner, *et al.,* J Kolodzey
   Optical properties and band structure of Ge(1-y)C(y) and Ge-rich Si(1-x-y)Ge(x)C(y) alloys.
   Thin Solid Films v313: 1998, pp 172-176.

Posters and Oral Presentations

G Gillespie, D Jamieson, O Onajole, and <u>NR Voss</u> (**Selected Poster**)
Penta-Fluorination of Phe-Phe Motif to Overcome Homochirality in Hierarchical Self-Assembly of Hydrogels
ACS Fall 2022: Sustainability in a Changing World, Chicago, IL: August 2022

<u>NR Voss</u> (**Invited Talk**)
The Future of Appion: a Road Map Ahead
Appion Developer Workshop, New York, NY: August 2018

<u>NR Voss</u> (**Invited Talk**)
Appion Developer Workshop, New York, NY: August 2017

<u>NR Voss</u> (**Invited Talk**)
Optimizations of the Appion Source Code; Implementing Leginon on JEOL microscopes.
Appion Developer Workshop, New York, NY: August 2015

K Fouch and <u>NR Voss</u> (**Presentation**)
Inexpensive 3D Models to Enhance Understanding in a Biology Lecture Course.
SENCER SCI-Midwest Regional Symposium, North Park, IL: March 2015

<u>NR Voss</u> (**Invited Talk**)
Implementation of Iterative Stable Alignment and Clustering (ISAC) in Appion.
Appion Developer Workshop, La Jolla, CA: July 2014

K Fouch and <u>NR Voss</u> (**Student Presentation**)
Inexpensive 3D Models to Enhance Understanding of Protein Structure.
Science and Math Research Symposium, Chicago, IL: April 2014

K Fouch and <u>NR Voss</u> (**Faculty–Student Joint Presentation**)
Inexpensive 3D Models to Enhance Understanding of Protein Structure.
SENCER SCI-Midwest Regional Symposium, Schaumburg, IL: March 2014

LK Sheth, AL Piotrowski, Q Nasir, and <u>NR Voss</u> (**Student Presentation**)
Visualization and Quality Assessment of the Contrast Transfer Function Estimation.
Science and Math Research Symposium, Chicago, IL: April 2013

LK Sheth, Q Nasir, SH Ali, S Patel, M Ali-Nasar and <u>NR Voss</u> (**Poster**)
Visualization and Comparison of the Contrast Transfer Function Fit across Software Packages.
NRAMM Workshop on Advanced Topics in EM Structure Determination, La Jolla, CA: November 2012

LK Sheth, Q Nasir, SH Ali, S Patel, M Ali-Nasar and <u>NR Voss</u> (**Invited Talk**)
Visualization and Comparison of the Contrast Transfer Function Fit across Software Packages.
Appion Developer Workshop, La Jolla, CA: August 2012

SJ Shenkar, SH Ali, and <u>NR Voss.</u> (**Student Presentation**)
Reduced Computer Processing Particle Alignment with Radon Transforms
Argonne National Lab Symposium for Undergraduate Research, Lemont, IL: October 2011

SJ Shenkar, SH Ali, and <u>NR Voss.</u> (**Invited Talk**)
Recent Developments in EM Structure Determination
Appion Developer Workshop, La Jolla, CA: August 2011

<u>NR Voss</u> (**Invited Presentation**)
Discovery of 3D biomolecular structures by cryo-electron microscopy.
Science and Math Research Symposium, Chicago, IL: April 2011

NR Voss (**Invited Presentation**)
Discovery of 3D biomolecular structures by cryo-electron microscopy.
Science Journal Club, Schaumburg, IL: November 2010

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