

N. DUANE LOH

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EDUCATION

Cornell University, Ithaca, NY, USA

Aug. 2010

Ph.D. in Theoretical Physics, supervisor Prof. Veit Elser
Thesis: "Statistics in Diffractive Imaging"

Harvey Mudd College, Claremont, CA, USA

May 2004

B.Sc. Physics, Minor in Mathematical Physics
Departmental Honors and High Distinction Award
Dean's list for four years (2000-2004)

WORK EXPERIENCE

Departments of Physics and Biological Sciences, Centre for Bio-imaging Sciences, Data Science Institute, National University of Singapore

Aug 2016 - current
Singapore

Assistant Professor

- Studied information theoretic limits of single particle imaging.
- Factor analyses to detect noisy fluid flows in *in-situ* electron microscopy.
- Studied giant viscosity increases near electrified solid-liquid interfaces.
- Design, implemented workflow for high-throughput electron microscopy.

Centre for Bio-imaging Sciences, National University of Singapore

Aug. 2013 - Aug. 2016
Singapore

Lee Kuan Yew Postdoctoral Fellow

- Studied non-continuum thin film physics in liquid cell electron microscopy.
- Developed hardware and software solution for single-electron detection.
- Developed non-classical nucleation model for noble metals in water.
- Developed classification methods for coherent diffractive imaging of heterogeneous populations of cells and organelles.
- Studied conditions for detecting weak particles for single particle diffractive imaging.

PULSE Institute, SLAC National Accelerator Laboratory

Aug. 2010 - Aug. 2013
Menlo Park, CA, USA

Research Fellow

- Pioneered fractal morphology on disordered aerosols.
- Developed algorithms for single particle imaging with X-ray free-electron lasers.
- Developed classification scheme to detect nascent ice clusters in supercooled water.
- Developed wavefront sensing technique with aerosols.

FELLOWSHIP AND AWARDS

Five X-ray Free-electron laser beamtimes

Nov. 2015 - Jul. 2017

three at Linac Coherent Light Source,
one at FERMI Elettra Sincrotrone,
one at SACLA SPring-9 Japan.

Lee Kuan Yew Postdoctoral Fellowship

Aug. 2013 - Jul. 2016

at NUS Centre for Bio-imaging Sciences
and NUS Department of Physics.

Travel grants

2018: STINT travel grant, on *High-performance computational tools to study heterogeneous structures with X-ray lasers* (Sweden).

2015: from COST MP1203, for Meeting on Coherent Imaging (Uppsala, Sweden).

2013: from Max Planck Institute, for Medical Research (Heidelberg, Germany) for the Ringberg Meeting on Free-electron Lasers (Ringberg, Germany).

2009: from Georg-August University Institute for X-ray Physics, for European Crystallographers' Meeting (Istanbul, Turkey).

RESEARCH GRANTS

MOE Tier-1 (S\$230k) Sole PI on “Data reduction for high throughput imaging of dose-sensitive materials”.	<i>Jun. 2020 - Jun. 2023</i>
NUS Early Career Research Award (S\$498k) Sole PI on “Experimental noise-robust phase retrieval for electron microscopy”.	<i>Oct. 2018 - Oct. 2021</i>
MOE Tier-1 (S\$150k) co-PI on “Atomic imaging of nanomaterials in three dimensions”.	<i>Mar. 2018 - Feb. 2021</i>
Data Science Institute (S\$160k) Sole PI on “The search for spatio-temporal epidemiological motifs”.	<i>Jul. 2017 - Jun. 2020</i>
NRF Competitive Research Programme Grant (S\$1,185k) co-PI on “Research and Development of novel interfacial processes for 3D nanofabrication”.	<i>Nov. 2016 - Sep. 2020</i>
Startup grant (S\$180k) Sole PI on “Information theoretic limits of single particle imaging”.	<i>Aug. 2016 - Jun. 2019</i>
MOE Tier-1 (S\$172k), Lee Kuan Yew Postdoctoral Fellowship Sole PI on “Resolving nanoscale heterogeneity and dynamics for incomplete, noisy datasets”.	<i>Sep. 2013 - Aug. 2016</i>
NUS Learning Innovation Fund-Technology (S\$69k) Main PI on “Mathematica in bio-imaging”. co-PIs: Assoc. Prof. Thorsten Wohland, Prof. Patrice Koehl.	<i>Aug. 2014 - Jul. 2017</i>

MENTORSHIP

Postdoctoral fellows.

- (2019-current) Dr. Jiadong Dan, NUS Biological Sciences.
- (2017-current) Dr. Shoucong Ning, NUS Material Science (co-funded by Prof. Steven Pennycook).
- (2016-current) Dr. Deepan Balakrishnan, NUS Biological Sciences.
- (2016-2020) Dr. Abhik Datta, NUS Biological Sciences.
- (2018-2020) Dr. Benedikt Daurer, NUS Biological Sciences.
- (2016-2019) Dr. Colin Teo, NUS Biological Sciences.
- (2016-2018) Dr. Matthias Kahk, NUS Biological Sciences.

Graduate students.

- (2020-current) Yeo Zhen Yuan, NUS Physics.
- (2017-current) Xin Chen, NUS Physics.
- (2016-current) Shen Zhou, NUS Physics.
- (2012-2013) Hyung Joo Park (with Veit Elser), at Cornell University.
- (2013) Jonas Sellberg (with Anders Nilsson), at SLAC National Accelerator Laboratory.

Research Assistants.

- (2019-2020) Ng Kian Fong.
- (2017-2018) Ms. Yvonne Ban, NUS Biological Sciences.
- (2017-2020) Mr. Yeo Zhen Yuan, NUS Biological Sciences.
- (2016) Asawari Choudhari, NUS Biological Sciences.
- (2014-2016) Zhaslan Baraissov.
- (2013-2016) Utkarsh Anand.

Interns.

- (2019) Vibha Balaji, BITS Pilanai.
- (2018) Adeesh Kolluru, Indian Institute of Technology (IIT) Delhi.
- (2015) Melissa Ding, Ohio State University.

High school students.

- (2020) Lei Johansson, Hwachong Junior College.
- (2016) Samuel Day-Weiss, Singapore American High School.

COURSES TAUGHT

Instructor at National University of Singapore.

- (2021-current) PC3270 Machine Learning for Physicists.
- (2019-current) BL5229 Fundamentals in Biophysical Sciences.
- (2016-2019) GEK1521/PC1326/GET1015 Physics in the Life Sciences.

- (2017-2019) MB5104 An Integrative Approach to Understand Cell Function.
- (2015-current) BL5232C Bio-imaging sciences (with Prof. Thorsten Wohland).
- (2013-2015) BL5232 Bio-imaging sciences (with Prof. Thorsten Wohland).

As teaching assistant at Cornell University.

- (2009) Undergraduate thermodynamics and statistical physics.
- (2009) Undergraduate general physics.
- (2008) Undergraduate analytical mechanics.
- (2004-2007) General Undergraduate Physics.

Publication list

40 papers (2009-2018): 38 published, 2 submitted. Papers with significant contributions **shown in bold**.

1. Zhou Shen, Colin Teo Zhi Wei, Kartik Ayyer, **N. Duane Loh**, **An encryption-decryption framework for validating single-particle imaging.** *arXiv:2007.03054*
2. Abhik Datta, See Wee Chee, **N. Duane Loh**, **ReCode: on-the-fly data reduction and compression for direct electron detectors.** *arXiv:1911.06013*
3. Egor Sobolev, Sergei Zolotarev, Klaus Giewekemeyer, Johan Bielecki, Kenta Okamoto, Hemanth KN Reddy, Jakob Andreasson, Kartik Ayyer, Imrich Barak, Sadia Bari, Anton Barty, Richard Bean, Sergey Bobkov, Henry N Chapman, Grzegorz Chojnowski, Benedikt J Daurer, Katerina Dörner, Tomas Ekeberg, Leonie Flückiger, Oxana Galzitskaya, Luca Gelisio, Steffen Hauf, Brenda G Hogue, Daniel A Horke, Ahmad Hosseinizadeh, Vyacheslav Ilyin, Chulho Jung, Chan Kim, Yoonhee Kim, Richard A Kirian, Henry Kirkwood, Olena Kulyk, Jochen Küpper, Romain Letrun, **N Duane Loh**, Kristina Lorenzen, Marc Messerschmidt, Kerstin Mühlig, Abbas Ourmazd, Natascha Raab, Andrei V Rode, Max Rose, Adam Round, Takushi Sato, Robin Schubert, Peter Schwander, Jonas A Sellberg, Marcin Sikorski, Alessandro Silenzi, Changyong Song, John CH Spence, Stephan Stern, Jolanta Sztuk-Dambietz, Anthon Teslyuk, Nicusor Timneanu, Martin Trebbin, Charlotte Uetrecht, Britta Weinhausen, Garth J Williams, P Lourdu Xavier, Chen Xu, Ivan A Vartanyants, Victor S Lamzin, Adrian Mancuso, Filipe RNC Maia, Megahertz single-particle imaging at the European XFEL. *Communications Physics* 3, 97 (2020)
4. Gisela Brändén, Greger Hammarin, Rajiv Harimoorthy, Alexander Johansson, David Arnlund, Erik Malmerberg, Anton Barty, Stefan Tångefjord, Peter Berntsen, Daniel P DePonte, Carolin Seuring, Thomas A White, Francesco Stellato, Richard Bean, Kenneth R Beyerlein, Leonard MG Chavas, Holger Fleckenstein, Cornelius Gati, Umesh Ghoshdastider, Lars Gumprecht, Dominik Oberthür, David Popp, Marvin Seibert, Thomas Tilp, Marc Messerschmidt, Garth J Williams, **N Duane Loh**, Henry N Chapman, Peter Zwart, Mengning Liang, Sébastien Boutet, Robert C Robinson, Richard Neutze, Coherent diffractive imaging of microtubules using an X-ray laser. *Nature communications* 10, 2589 (2019)
5. K. Giewekemeyer, A. Aquila, **N.D. Loh**, Y. Chushkin, K.S. Shanks, J. Weiss, M.W. Tate, H.T. Philipp, S. Stern, P. Vagovic, M. Mehrjoo, c M. Barthelmess, F. Zontone, C. Chang, Richard C. Tiberio, A. Sakdinawat, G.J. Williams, d S.M. Gruner, and A.P. Mancuso, **Experimental 3D Coherent Diffractive Imaging from photon-sparse random projections.** *IUCrJ* 6 (3), 357-365 (2019)
6. J. Matthias Kahk, Beng Hau Tan, Claus Dieter-Ohl, **N. Duane Loh**, **Viscous field-aligned water exhibits cubic-ice-like structural motifs.** *Physical Chemistry Chemical Physics* 20 (30), 19877-19884 (2018)
7. Carsten Fortmann-Grote, Alexey Buzmakov, Zoltan Jurek, **Ne-Te Duane Loh**, Liubov Samoylova, Robin Santra, Evgeny A. Schneidmiller, Thomas Tschentscher, Sergey Yakubov, Chun Hong Yoon, Michael V. Yurkov, Beata Ziajac, and Adrian P. Mancuso **Start-to-end simulation of single particle imaging using ultra-short pulses at the European X-ray Free Electron Laser.** *IUCrJ*, 4, 560-568 (2017).
8. Andrew J. Amaya, Harshad Pathak, Viraj P. Modak, Hartawan Laksmono, **N. Duane Loh**, Jonas A. Sellberg, Raymond G. Sierra, Trevor A. McQueen, Matt J. Hayes, Garth J. Williams, Marc Messerschmidt, Sébastien Boutet, Michael J. Bogan, Anders Nilsson, Claudiu A. Stan, and Barbara E. Wyslouzil **How cubic can ice be?** *The Journal of Physical Chemistry Letters*, 8, 3216-3222 (2017).
9. D. Popp, **N.D. Loh**, M. Liang, R. Millane, B. Robinson, and others. **Flow-aligned single-shot fiber diffraction using femtosecond X-ray free-electron laser.** *Cytoskeleton*, 74(12):472-481, 2017
10. Benedikt J Daurer, Kenta Okamoto, Johan Bielecki, Filipe RNC Maia, Kerstin Mühlig, M Marvin Seibert, Max F Hantke, Carl Nettelblad, W Henry Benner, Martin Svenda, Nicusor Timneanu, Tomas Ekeberg, **N.D. Loh**, Alberto Pietrini, Alessandro Zani, Asawari D Rath, Daniel Westphal, Richard A Kirian, Salah Awel, Max O Wiedorn, Gijs van der Schot, Gunilla H Carlsson, Dirk Hasse, Jonas A Sellberg, Anton Barty, Jakob Andreasson, Sébastien Boutet, Garth Williams, Jason Koglin, Inger Andersson, Janos Hajdu, Daniel SD Larsson. **Experimental strategies for imaging bioparticles with femtosecond hard X-ray pulses.** *IUCrJ*, 4(3) 251-262, 2017.
11. Anna Munke, Jakob Andreasson, Andrew Aquila, Salah Awel, Kartik Ayyer, Anton Barty, Richard J Bean, Peter Berntsen, Johan Bielecki, Sébastien Boutet, Maximilian Bucher, Henry N Chapman, Benedikt J Daurer, Hasan DeMirici, Veit Elser, Petra Fromme, Janos Hajdu, Max F Hantke, Akifumi Higashiura, Brenda G Hogue, Ahmad Hosseinizadeh, Yoonhee Kim, Richard A Kirian, Hemanth K N Reddy, Ti-Yen Lan, Daniel S D Larsson, Haiguang Liu, **N Duane Loh**, Filipe R N C Maia, Adrian P Mancuso, Kerstin Mühlig, Atsushi Nakagawa, Daewoong Nam, Garrett Nelson, Carl Nettelblad, Kenta Okamoto, Abbas Ourmazd, Max Rose, Gijs van der Schot, Peter Schwander, M Marvin Seibert, Jonas A Sellberg, Raymond G Sierra, Changyong Song, Martin Svenda, Nicusor Timneanu, Ivan A Vartanyants, Daniel Westphal, Max O Wiedorn, Garth J Williams, Paulraj Lourdu Xavier,

- Chun Hong Yoon, and James Zook. **Coherent diffraction of single rice dwarf virus particles using hard x-rays at the linac coherent light source.** *Scientific Data*, 3:160064, 1 August 2016.
12. S.W. Chee, Z. Baraissov, **N.D. Loh**, and U. Mirsaidov. **Stick-slip diffusion of nanoparticles at the liquid-solid interface.** *The Journal of Physical Chemistry C*, 120, 20462720470, 2016.
 13. **N.D. Loh**, S. Sen, M. Bosman, S.F. Tan, J. Zhong, C.A. Nijhuis, P. Kral, P. Matsudaira, and U. Mirsaidov. **Multi-step nucleation of nanocrystals in aqueous solution.** *Nature Chemistry*, 9, 77-82, 2017.
 14. Filipe R N C Maia, Thomas A White, **N Duane Loh**, and Janos Hajdu. **CCP-FEL: a collection of computer programs for free-electron laser research.** *J. Appl. Crystallogr.*, 49(4):1117–1120, August 2016.
 15. K. Ayyer, T.Y. Lan, V. Elser, **N.D. Loh**. **The Expand-Maximize-Compress Single Particle Imaging Algorithm.** *Journal of Applied Crystallography*, 49, 2016.
 16. C.H. Yoon, M.V. Yurkov, E.A. Schneidmiller, L. Samoylova, A. Buzmakov, Z. Jurek, B. Ziaja, R. Santra, **N.D. Loh**, T. Tschentscher, A.P. Mancuso. **simS2E: A multi-physics simulation framework for an X-ray free electron laser single particle imaging experiment.** *Scientific reports*, 6 (24791): 1-11, 2016
 17. U. Anand, J. Lu, **D. Loh**, Z. Aabdin, and U. Mirsaidov. **Hydration Layer-mediated Pairwise Interaction of Nanoparticles.** *Nano Lett.*, 16(1):786–790, 2015.
 18. H. Laksmono, T. A. McQueen, J. A. Sellberg, **N. D. Loh**, C. Huang, D. Schlesinger, R. G. Sierra, C. Y. Hampton, D. Nordlund, M. Beye, A. V. Martin, A. Barty, M. M. Seibert, M. Messerschmidt, G. J. Williams, S. Boutet, K. Amann-Winkel, T. Loerting, L. G. M. Pettersson, M. J. Bogan, and A. Nilsson. **Anomalous Behavior of the Homogeneous Ice Nucleation Rate in No-Man's Land.** *J. Phys. Chem. Lett.*, 6:2826–2832, 2015.
 19. G. van der Schot, M. Svenda, F. R. N. C. Maia, M. Hantke, D. P. DePonte, M. M. Seibert, A. Aquila, J. Schulz, R. Kirian, M. Liang, F. Stellato, B. Iwan, J. Andreasson, N. Timneanu, D. Westphal, F. N. Almeida, D. Odic, D. Hasse, G. H. Carlsson, D. S. D. Larsson, A. Barty, A. V. Martin, S. Schorb, C. Bostedt, J. D. Bozek, D. Rolles, A. Rudenko, S. Epp, L. Foucar, B. Rudek, R. Hartmann, N. Kimmel, P. Holl, L. Englert, **N.-T. Duane Loh**, H. N. Chapman, I. Andersson, J. Hajdu, and T. Ekeberg. **Imaging single cells in a beam of live cyanobacteria with an X-ray laser.** *Nat. Commun.*, 6:5704, 2015.
 20. **N. D. Loh**. **A minimal view of single-particle imaging with X-ray lasers.** *Philos. Trans. R. Soc. B Biol. Sci.*, 369(1647):20130328, 2014.
 21. M. F. Hantke, D. Hasse, F. R. N. C. Maia, T. Ekeberg, K. John, M. Svenda, **N. D. Loh**, A. V. Martin, N. Timneanu, D. S. D. Larsson, G. van der Schot, G. H. Carlsson, M. Ingelman, J. Andreasson, D. Westphal, M. Liang, F. Stellato, D. P. DePonte, R. Hartmann, N. Kimmel, R. A. Kirian, M. M. Seibert, K. Mühlig, S. Schorb, K. Ferguson, C. Bostedt, S. Carron, J. D. Bozek, D. Rolles, A. Rudenko, S. Epp, H. N. Chapman, A. Barty, J. Hajdu, and I. Andersson. **High-throughput imaging of heterogeneous cell organelles with an X-ray laser.** *Nat. Photonics*, 8(12):943–949, nov 2014.
 22. T. Ekeberg, M. Svenda, C. Abergel, F. R. Maia, V. Seltzer, J.-M. Claverie, M. Hantke, O. Jönsson, C. Nettelblad, G. van der Schot, M. Liang, D. P. DePonte, A. Barty, M. M. Seibert, B. Iwan, I. Andersson, **N. D. Loh**, A. V. Martin, H. Chapman, C. Bostedt, J. D. Bozek, K. R. Ferguson, J. Krzywinski, S. W. Epp, D. Rolles, A. Rudenko, R. Hartmann, N. Kimmel, and J. Hajdu. **Three-Dimensional Reconstruction of the Giant Mimivirus Particle with an X-Ray Free-Electron Laser.** *Phys. Rev. Lett.*, 114(9):1–6, 2015.
 23. J. Lu, Z. Aabdin, **N. D. Loh**, D. Bhattacharya, and U. Mirsaidov. **Nanoparticle Dynamics in a Nanodroplet.** *Nano Lett.*, 14(4):2111–2115, 2014. PMID: 24641092.
 24. Z. Aabdin, J. Lu, X. Zhu, U. Anand, **N. D. Loh**, H. Su, and U. Mirsaidov. **Bonding pathways of gold nanocrystals in solution.** *Nano Lett.*, 14(11):6639–43, nov 2014. PMID: 25299120.
 25. J. A. Sellberg, C. Huang, T. A. McQueen, **N. D. Loh**, H. Laksmono, D. Schlesinger, R. G. Sierra, D. Nordlund, C. Y. Hampton, D. Starodub, D. P. DePonte, M. Beye, C. Chen, A. V. Martin, A. Barty, K. T. Wikfeldt, T. M. Weiss, C. Caronna, J. Feldkamp, L. B. Skinner, M. M. Seibert, M. Messerschmidt, G. J. Williams, S. Boutet, L. G. M. Pettersson, M. J. Bogan, and A. Nilsson. **Ultrafast X-ray probing of water structure below the homogeneous ice nucleation temperature.** *Nature*, 510(7505):381–384, 2014.
 26. H. J. Park, **N. D. Loh**, R. G. Sierra, C. Y. Hampton, M. J. Bogan, V. Elser, and Others. **Toward unsupervised single-shot diffractive imaging of heterogeneous particles using X-ray free-electron lasers.** *Opt. Express*, 21(23):28729–28742, 2013.
 27. E. Pedersoli, **N. D. Loh**, F. Capotondi, C. Y. Hampton, R. G. Sierra, D. Starodub, C. Bostedt, J. Bozek, A. J. Nelson, M. Aslam, S. Li, V. P. Dravid, A. V. Martin, A. Aquila, A. Barty, H. Fleckenstein, L. Gumprecht, M. Liang, K. Nass, J. Schulz, T. A. White, N. Coppola, S. Bajt, M. Barthelmess, H. Graafsma, H. Hirsemann, C. Wunderer, S. W. Epp, B. Erk, B. Rudek, A. Rudenko, L. Foucar, S. Kassemeyer, L. Lomb, D. Rolles, R. L. Shoeman, J. F. Steinbrener, R. Hartmann, A. Hartmann, G. Hauser, P. Holl, N. Kimmel, C. Reich, H. Soltau, G. Weidenspointner, W. H. Benner, G. R. Farquar, S. P. Hau-Riege, M. S. Hunter, T. Ekeberg, M. Hantke, F. R. N. C. Maia, H. J. Tobias, S. Marchesini, M. Frank, L. Strüder, I. Schlichting, J. Ullrich, H. N. Chapman, P. H. Bucksbaum, M. Kiskinova, and M. J. Bogan. **Mesoscale morphology of airborne core-shell nanoparticle clusters: x-ray laser coherent diffraction imaging.** *J. Phys. B At. Mol. Opt. Phys*, 46(16):164033, 2013.
 28. A. V. Martin and **N. T. D. Loh**. **X-ray Free-Electron Lasers: Illuminating a New Path to Single Particle Imaging.** *Synchrotron Radiat. News*, 26(2):11–19, 2013.
 29. **N. D. Loh**, D. Starodub, L. Lomb, C. Y. Hampton, A. V. Martin, R. G. Sierra, A. Barty, A. Aquila, J. Schulz, and J. F. Steinbrener, and others. **Sensing the wavefront of x-ray free-electron lasers using aerosol spheres.** *Opt. Express*, 21(10):12385–12394, 2013.
 30. **N. D. Loh**, C. Y. Hampton, A. V. Martin, D. Starodub, R. G. Sierra, A. Barty, A. Aquila, J. Schulz, L. Lomb, J. F. Steinbrener, R. L. Shoeman, S. Kassemeyer, C. Bostedt, J. Bozek, S. W. Epp, B. Erk, R. Hartmann, D. Rolles, A. Rudenko, B. Rudek,

- L. Foucar, N. Kimmel, G. Weidenspointner, G. Hauser, P. Holl, E. Pedersoli, M. Liang, M. S. Hunter, L. Gumprecht, N. Coppola, C. Wunderer, H. Graafsma, F. R. N. C. Maia, T. Ekeberg, M. Hantke, H. Fleckenstein, H. Hirsemann, K. Nass, T. A. White, H. J. Tobias, G. R. Farquar, W. H. Benner, S. P. Hau-Riege, C. Reich, A. Hartmann, H. Soltau, S. Marchesini, S. Bajt, M. Barthelmess, P. H. Bucksbaum, K. O. Hodgson, L. Strüder, J. Ullrich, M. Frank, I. Schlichting, H. N. Chapman, and M. J. Bogan. **Fractal morphology, imaging and mass spectrometry of single aerosol particles in flight.** *Nature*, 486(7404):513–517, 2012.
31. D. Starodub, A. Aquila, S. Bajt, M. Barthelmess, A. Barty, C. Bostedt, J. D. Bozek, N. Coppola, R. B. Doak, S. W. Epp, B. Erk, L. Foucar, L. Gumprecht, C. Y. Hampton, A. Hartmann, R. Hartmann, P. Holl, S. Kassemeyer, N. Kimmel, H. Laksmono, M. Liang, **N. D. Loh**, L. Lomb, A. V. Martin, K. Nass, C. Reich, D. Rolles, B. Rudek, A. Rudenko, J. Schulz, R. L. Shoeman, R. G. Sierra, H. Soltau, J. F. Steinbrener, F. Stellato, S. Stern, G. Weidenspointner, M. Frank, J. Ullrich, L. Strüder, I. Schlichting, H. N. Chapman, J. C. H. Spence, and M. J. Bogan. **Single-particle structure determination by correlations of snapshot X-ray diffraction patterns.** *Nat. Commun.*, 3:1276:1–7, 2012.
 32. A. V. Martin, **N. D. Loh**, C. Y. Hampton, R. G. Sierra, F. Wang, A. Aquila, S. Bajt, M. Barthelmess, C. Bostedt, J. D. Bozek, N. Coppola, S. W. Epp, B. Erk, H. Fleckenstein, L. Foucar, M. Frank, H. Graafsma, L. Gumprecht, A. Hartmann, R. Hartmann, G. Hauser, H. Hirsemann, P. Holl, S. Kassemeyer, N. Kimmel, M. Liang, L. Lomb, F. R. N. C. Maia, S. Marchesini, K. Nass, E. Pedersoli, C. Reich, D. Rolles, B. Rudek, A. Rudenko, J. Schulz, R. L. Shoeman, H. Soltau, D. Starodub, J. F. Steinbrener, F. Stellato, L. Strüder, J. Ullrich, G. Weidenspointner, T. A. White, C. B. Wunderer, A. Barty, I. Schlichting, M. J. Bogan, and H. N. Chapman. **Femtosecond dark-field imaging with an X-ray free electron laser.** *Opt. Express*, 20(12):13501–13512, 2012.
 33. R. G. Sierra, H. Laksmono, J. Kern, R. Tran, J. Hattne, R. Alonso-Mori, B. Lassalle-Kaiser, C. Glockner, J. Hellmich, D. W. Schafer, N. Echols, R. J. Gildea, R. W. Grosse-Kunstleve, J. Sellberg, T. A. McQueen, A. R. Fry, M. M. Messerschmidt, A. Miahnahri, M. M. Seibert, C. Y. Hampton, D. Starodub, **N. D. Loh**, D. Sokaras, T. C. Weng, P. H. Zwart, P. Glatzel, D. Milathianaki, W. E. White, P. D. Adams, G. J. Williams, S. Boutet, A. Zouni, J. Messinger, N. K. Sauter, U. Bergmann, J. Yano, V. K. Yachandra, and M. J. Bogan. Nanoflow electrospraying serial femtosecond crystallography. *Acta Crystallogr. Sect. D*, 68:1584–1587, 2012.
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