NIKOLAUS GRIGORIEFF

Professor, University of Massachusetts Medical School
Investigator, Howard Hughes Medical Institute

19700 Helix Drive, VA 20147
Tel. (571) 209 4169, Fax (571) 209 6463
Email: niko@grigorieff.org

ACADEMIC EDUCATION

1985 - 1989	Technische Universität Berlin, Germany Vordiplom in physics (first grade)
1989 - 1993	University of Bristol, UK M.Sc. & Ph.D. in physics (semiconducting materials and devices, electron microscopy)

EXPERIENCE

1988 - 1989	Technische Universität Berlin, Germany • Tutor with teaching responsibilities • Student representative on faculty board, joint responsibility for faculty policies and degree course design
1991 - 1993	University of Bristol, UK • Demonstrator in undergraduate project laboratory, responsible for student supervision and grading
1993 - 1998	MRC Laboratory of Molecular Biology, Cambridge, UK • Postdoctoral research assistant • Supervisor for research student, responsible for project design and supervision
1996 - 1998	Darwin College, Cambridge, UK • Organizer of scientific seminars
1999 - 2013	Brandeis University, Waltham, MA • Assistant Professor (1999), Associate Professor (2004), Full Professor (2006)
2013 - 2018	Janelia Research Campus, Ashburn, VA •Group leader
2018 - present	University of Massachusetts Medical School, Worcester, MA • Professor

AWARDS, FELLOWSHIPS AND APPOINTMENTS

1988-90	Award from the Studienstiftung des Deutschen Volkes (national student award based on university nomination and interview)
1989	Award from DAAD (German Academic Exchange Service)
1990-93	Student grant from British Telecommunications plc.
1995-96	Research fellowship from Deutsche Forschungsgemeinschaft
1996-98	Research fellowship at Darwin College, Cambridge, England
2000-present	Investigatorship, Howard Hughes Medical Institute
2004-05	Research fellowship from the Humboldt Foundation

RESEARCH ARTICLES

Grigorieff, N., Cherns, D., Yates, M. J., Hockly, M., Perrin, S. D. & Aylett, M. R. (1993). Electron microscopy of ultra-thin buried layers in InP and InGaAs. *Phil. Mag.* **68**, 121–136.

Grigorieff, N., Cherns, D., Preston, A. R. & Yates, M. J. (1995). Models for termination of crystal boundaries in the theory of transmission electron diffraction and comparison with experimental data. *Acta Cryst.* **A51**, 343–350.

Grigorieff, N., Beckmann, E. & Zemlin, F. (1995). Lipid location in deoxycholate-treated purple membrane at 2.6 Å. *J. Mol. Biol.* **254**, 404–415.

Grigorieff, N. & Henderson, R. (1995). Diffuse scattering in electron diffraction data from protein crystals. *Ultramicroscopy* **60**, 295–309.

Grigorieff, N., Ceska, T. A., Downing, K. H., Baldwin, J. M. & Henderson, R. (1996). Electron-crystallographic refinement of the structure of bacteriorhodopsin. *J. Mol. Biol.* **259**, 393–421.

Grigorieff, N. & Henderson, R. (1996). Comparison of calculated and observed dynamical diffraction from purple membrane: implications. *Ultramicroscopy* **65**, 101–107.

Grigorieff, N. (1998). Three-dimensional structure of bovine NADH:ubiquinone oxidoreductase (complex I) at 22 Å in ice. *J. Mol. Biol.* **277**, 1033–1046.

Smith, C. J., Grigorieff, N. & Pearse, B. M. F. (1998). Clathrin coats at 21 Å resolution - A cellular assembly designed to recycle multiple membrane receptors. *EMBO J.* **17**, 4943–4953.

Lam, Y.-M., Grigorieff, N. & Goldbeck-Wood, G. (1999) Direct visualisation of micelles of pluronic block coploymers in aqueous solution by cryo-TEM. *Phys. Chem. Chem. Phys*. **1**, 3331–3334.

Grigorieff, N. & Grigorieff, R. D. (1999). Asymptotisches Verhalten des Erwartungswertes für den größten Wert bei n unabhängigen Beobachtungen einer normalverteilten Variablen. *Reprint-Reihe Fachbereich Mathematik, Technische Universität Berlin* Nr. 647.

Grigorieff, N. (2000) Resolution Measurement in Structures Derived from Single Particles. *Acta Cryst.* **D56**, 1270–1277.

Mindell, J. A., Maduke, M., Miller, C. & Grigorieff, N. (2001). Projection structure of a ClC-type chloride channel at 6.5 Å resolution. *Nature* **409**, 219–223.

Sokolova, O., Kolmakova-Partensky, L. & Grigorieff, N. (2001). Three-dimensional structure of a voltage-gated potassium channel at 2.5 nm resolution. *Structure* **9**, 215–220.

Pirruccello, M.M., N. Grigorieff, and J.A. Mindell, (2002) Electron diffraction of a bacterial ClC-type chloride channel. *Novartis Found Symp.* **245**,193–203.

McGovern, S. L., Caselli, E., Grigorieff, N. & Shoichet, B. K. (2002) A common mechanism underlying promiscuous inhibitors from virtual and high-throughput screening. *J. Med. Chem.* **45**, 1712–1722.

Jurica, M. S., Licklider, L. J., Gygi, S. P., Grigorieff, N. & Moore, M. J. (2002) Purification and characterization of native spliceosomes suitable for three-dimensional structural studies. *RNA* **8**, 426–439.

Mindell, J. A. & Grigorieff, N. (2003) Accurate determination of local defocus and specimen tilt in electron microscopy. *J. Struct. Biol*. **142**, 334–347.

Furst, J., Sutton, R. B., Chen, J., Brunger, A. T. & Grigorieff, N. (2003) Electron Cryo-Microscopy Structure of N-ethyl Maleimide Sensitive Factor at 11 Å Resolution. *EMBO J*. **22**, 4365–4374.

Wolf, M., Eberhart, A., Glossmann, H., Striessnig, J. & Grigorieff, N. (2003) Visualization of the Domain Structure of an L-Type Ca^{2+} Channel Using Electron Cryo-Microscopy. *J. Mol. Biol*. **332**, 171–182.

Sokolova, O., Accardi, A., Gutierrez, D., Lau, A., Rigney, M. & Grigorieff, N. (2003). Conformational changes in the C-terminus of *Shaker* K^+ channel, bound to the rat Kvβ2-subunit. *PNAS* **100**, 12607–12612.

Chen, J. Z., Furst, J., Chapman, M. S. & Grigorieff, N. (2003) Low-resolution structure refinement in electron microscopy. *J. Struct. Biol*. **144**, 144–151.

Jurica, M. S., Sousa, D., Moore, M. J. & Grigorieff, N. (2004) Three-dimensional structure of C complex spliceosomes by electron microscopy. *Nature Struct. Mol. Biol.* **11**, 265–269.

Kim, L. A., Furst, J., Butler, M., Xu, S., Grigorieff, N. & Goldstein, S. A. N. (2004) Subunit Composition of Kv4.2-KChiP2 Potassium Channel. *J. Biol. Chem.* **279**, 5549–5554.

Kim, L. A., Furst, J., Gutierrez, D., Butler, M., Xu, S., Goldstein, S. A. N. & Grigorieff, N. (2004) Three-Dimensional Structure of Kv4.2-KChiP2 Channels by Electron Microscopy at 21 Å. *Neuron* **41**, 513–519.

Stewart, A. & Grigorieff, N. (2004) Noise bias in the refinement of structures derived from single particles. *Ultramicroscopy* **102**, 67–84.

Fotin, A., Cheng, Y., Sliz, P., Grigorieff, N., Harrison, S. C., Kirchhausen, T., & Walz, T. (2004) Molecular model for a complete clathrin lattice from electron cryomicroscopy. *Nature* **432**, 573–579.

Fotin, A., Cheng, Y., Grigorieff, N., Walz, T., Harrison, S. C. & Kirchhausen, T. (2004) Structure of an auxilin-bound clathrin coat and its implications for the mechanism of uncoating. *Nature* **432**, 649–653.

Rodal, A. A., Sokolova, O., Robins, D. B., Daugherty, K. M., Hippenmeyer, S., Riezman, H., Grigorieff, N. & Goode, B. L. (2005) Conformational changes in the Arp2/3 complex leading to actin nucleation. *Nature Struct. Mol. Biol.* **12**, 26–31.

Cheng, Y., Wolf, E., Larvie, M., Zak, O., Aisen, P., Grigorieff, N., C. Harrison, S. C. & Walz, T. (2006) Single Particle Reconstructions of the Transferrin–transferrin receptor complex obtained with different specimen preparation techniques. *J. Mol. Biol.* **355**, 1048–1065.

Wolf, M., DeRosier, D. J. & Grigorieff, N. (2006) Ewald sphere correction for single particle electron microscopy. *Ultramicroscopy* **106**, 376–382.

Stroupe, M. E., Tange, T. Ø., Thomas, D. R., Moore, M. J. & Grigorieff. N. (2006) The three-dimensional architecture of the EJC core. *J. Mol. Biol.* **360**, 743–749.

Fotin, A., Kirchhausen, T., Grigorieff, N., Harrison, S. C., Walz, T. & Cheng, Y. (2006) Structure determination of clathrin coats to subnanometer resolution by single particle cryo-electron microscopy. *J. Struct. Biol.* **156**, 453–460.

Sachse, C., Xu, C., Wieligmann, K., Diekmann, S., Grigorieff, N. & Fändrich, M. (2006) Quaternary structure of a mature amyloid fibril from Alzheimer's Aβ(1-40) peptide. *J. Mol. Biol.* **362**, 347–354.

Grigorieff, N. (2007) FREALIGN: High-resolution refinement of single particle structures. *J. Struct. Biol.* **157**, 117–125.

Chen, J. Z. & Grigorieff, N. (2007) SIGNATURE: A single-particle selection system for molecular electron microscopy. *J. Struct. Biol.* **157**, 168–173.

Sousa, D. & Grigorieff, N. (2007) Ab initio resolution measurement for single particle structures. *J. Struct. Biol.* **157**, 201–210.

Sachse, C., Chen, J. Z., Coureux, P.-D., Stroupe, M. E., Fändrich, M. & Grigorieff, N. (2007) High-resolution electron microscopy of helical specimens: a fresh look at tobacco mosaic virus. *J. Mol. Biol.* **371**, 812–835.

Zeng, X., Stahlberg, H. & Grigorieff, N. (2007) A maximum likelihood approach to two-dimensional crystals. *J. Struct. Biol.* **160**, 362–374.

Chen, J. Z., Sachse, C., Xu, C., Mielke, T., Spahn, C. M. T. & Grigorieff, N. (2008) A Dose-Rate Effect in Single-Particle Electron Microscope. *J. Struct. Biol.* **161**, 92–100.

Zhang, X., Settembre, E., Xu, C., Dormitzer, P. R., Bellamy, R., Harrison, S. C. & Grigorieff, N. (2008) Near-atomic resolution using electron cryo-microscopy and single particle reconstruction. *PNAS* **105**, 1867–1872.

Zolotarev, A. S., Unnikrishnan, M., Shmukler, B. E., Clark, J. S., Vandorpe, D. H., Grigorieff, N., Rubin, E. J. & Alper, S. L. (2008) Increased sulfate uptake by *E. coli* overexpressing the SLC26-related SulP protein Rv1739c from *Mycobacterium tuberculosis*. *Comp. Biochem. Physiol. A* **149**, 255–266.

Sachse, C., Fändrich, M. & Grigorieff, N. (2008) Paired β-sheet structure of an Aβ(1-40) amyloid fibril revealed by electron microscopy. *PNAS* **105**, 7462–7466.

Stroupe, M. E., Xu, C., Goode, B. L. & Grigorieff. N. (2009) Actin filament labels for localizing protein components in large complexes viewed by electron microscopy. *RNA* **15**, 244–248.

Meinhardt, J., Sachse, C., Hortschansky, P., Grigorieff, N. & Fändrich, M. (2009) Aβ(1-40) fibril polymorphism implies diverse interaction patterns in amyloid fibril. *J. Mol. Biol.* **386**, 869–877.

Dementieva, I. S., Tereshko, V., McCrossan, Y. A., Solomaha, E., Araki, D., Xu, C., Grigorieff, N. & Goldstein, S. A. N. (2009) Pentameric assembly of potassium channel tetramerization domain-containing protein 5 (KCTD5). *J. Mol. Biol.* **387**, 175–191.

Chen, J. Z., Settembre, E., Aoki, S. T., Zhang, X., Bellamy, A. R., Dormitzer, P. R., Harrison, S. C. & Grigorieff, N. (2009) Molecular interactions in rotavirus assembly and uncoating seen by high-resolution cryo-EM. *PNAS* **106**, 10644–10648.

Schmidt, M., Sachse, C., Richter, W., Xu, C., Fändrich, M. & Grigorieff, N. (2009) Comparison of Alzheimer Aβ(1-40) and Aβ(1-42) amyloid fibrils reveals similar protofilament structures. *PNAS* **106**, 19813–19818.

Sachse, C., Grigorieff, N. & Fändrich, M. (2010) Nanoscale flexibility parameters of Alzheimer amyloid fibrils determined using electron cryo-microscopy. *Angew. Chem. Int. Ed.* **49**, 1321–1323.

Xing, Y., Böcking, T., Wolf, M., Grigorieff, N., Kirchhausen, T. & Harrison, S. C. (2010) Structure of clathrin coat with bound Hsc70 and auxilin: mechanism of Hsc70-facilitated disassembly. *EMBO J.* **29**, 655–665.

Wolf, M., Garcea, R. L., Grigorieff, N. & Harrison, S. C. (2010) Subunit interactions in bovine papillomavirus. *PNAS* **107**, 6298–6303.

Okada, K., Bartolini, F., Deaconescu, A. M., Moseley, J. B., Dogic, Z., Grigorieff, N., Gundersen, G. G. & Goode, B. L. (2010) Adenomatous polyposis coli protein nucleates actin assembly and synergizes with the formin mDia1. *J. Cell Biol.* **189**, 1087–1096.

Li, X., Grigorieff, N. & Cheng, Y. (2010) GPU-enabled FREALIGN: accelerating single particle 3D reconstruction and refinement in Fourier space on graphic processors. *J. Struct. Biol.* **172**, 407–412.

Alushin, G., Ramey, V., Pasqualato, S., Ball, D., Grigorieff, N., Musacchio, A. & Nogales, N. (2010) The Ndc80 kinetochore complex forms oligomeric arrays along microtubules. *Nature* **467**, 805–810.

Settembre, E., Chen, J. Z., Dormitzer, P. R., Grigorieff, N. & Harrison, S. C. (2011) Atomic model of an infectious rotavirus particle. *EMBO J.* **30**, 408–416.

Sindelar, C. V. & Grigorieff, N. (2011) An adaptation of the Wiener filter suitable for analyzing images of isolated single particles. *J. Struct. Biol.* **176**, 60–74.

Lewandowski, J. R., van der Wel, P. C., Rigney, M., Grigorieff, N. & Griffin, R. G. (2011) Structural complexity of a composite amyloid fibril. *J. Am. Chem. Soc.* **133**, 14686–14698.

Henderson, R., Chen, S., Chen, J. Z., Grigorieff, N., Passmore, L. A., Ciccarelli, L., Rubinstein, J. L., Crowther, R. A., Stewart, P. L. & Rosenthal, P. B. (2011) Tilt-pair analysis of images from a range of different specimens in single-particle electron cryomicroscopy. *J. Mol. Biol.* **413**, 1028–1046.

Henderson, R., Sali, A., Baker, M. L., Carragher, B., Devkota, B., Downing, K. H., Egelman, E. H., Feng, Z., Frank, J., Grigorieff, N., Jiang, W., Ludtke, S. J., Medalia, O., Penczek, P. A., Rosenthal, P. B., Rossmann, M. G., Schmid, M. F., Schröder, G. F., Steven, A. C., Stokes, D. L., Westbrook, J. D., Wriggers, W., Yang, H., Young, J., Berman, H. M., Chiu, W., Kleywegt, G. J.

& Lawson, C. L. (2012) Outcome of the first electron microscopy validation task force meeting. *Structure* **20**, 205–214.

Deaconescu, A. M., Sevostyanova, A., Artsimovitch, I. & Grigorieff, N. (2012) Nucleotide excision repair (NER) machinery recruitment by the transcription-repair coupling factor involves unmasking of a conserved intramolecular interface. *PNAS* **109**, 3353–3358.

Brilot, A. F., Chen J. Z., Cheng, A., Pan, J., Harrison, S. C., Potter, C. S., Carragher, B., Henderson, R., Grigorieff, N. (2012) Beam-induced motion of vitrified specimen on holey carbon film. *J. Struct. Biol.* **177**, 630–637.

Sindelar, C. V. & Grigorieff, N. (2012) Optimal noise reduction in 3D reconstructions of single particles using a volume-normalized filter. *J. Struct. Biol.* **180**, 26–38.

Veesler, D., Quispe, J., Grigorieff, N., Potter, C. S., Carragher, B. & Johnson, J. E. (2012) Maturation in action: cryoEM study of a viral capsid caught during expansion. *Structure* **20**, 1384–1390.

Campbell, M. G., Cheng, A., Brilot, A. F., Moeller, A., Lyumkis, D., Veesler, D., Pan, J., Harrison, S. C., Potter, C. S., Carragher, B. & Grigorieff, N. (2012) Movies of ice-embedded particles enhance resolution in electron cryo-microscopy. *Structure* **20**, 1823–1828.

Estrozi, L. F., Settembre, E. C., Goret, G., McClain, B., Zhang, X., Chen, J. Z., Grigorieff, N. & Harrison, S.C. (2013) Location of the dsRNA-dependent polymerase, VP1, in rotavirus particles. *J. Mol. Biol.* **425**, 124–132.

Lyumkis, D., Brilot, A. F., Theobald, D. L. & Grigorieff, N. (2013) Likelihood-based classification of cryo-EM images using FREALIGN. *J. Struct. Biol.* **183**, 377–388.

Brilot, A. F., Korostelev, A. A., Ermolenko, D. N. & Grigorieff N. (2013) Structure of the ribosome with elongation factor G trapped in the pre-translocation state. *PNAS* **110**, 20994–20999.

Ruskin, R. S., Yu, Z. & Grigorieff, N. (2013) Quantitative characterization of electron detectors for transmission electron microscopy. *J. Struct. Biol.* **184**, 385–393.

Rohou, A. & Grigorieff, N. (2014) Frealix: model-based refinement of helical filament structures from electron micrographs. *J. Struct. Biol.* **186**, 234–244.

Svidritskiy, E., Brilot, A. F., Koh, C. S., Grigorieff N. & Korostelev A. A. (2014) Structures of yeast 80S ribosome-tRNA complexes in the rotated and nonrotated conformations. *Structure* **22**, 1210–1218.

Koh, C. S., Brilot, A. F., Grigorieff, N. & Korostelev, A. A. (2014) Taura syndrome virus IRES initiates translation by binding its tRNA-mRNA-like structural element in the ribosomal decoding center. *PNAS* **111**, 9139–9144.

Szyk, A., Deaconescu, A. M., Spector, J., Goodman, B., Valenstein, M. L., Ziolkowska, N. E., Kormendi, V., Grigorieff, N. & Roll-Mecak, A. (2014) Molecular basis for age-dependent microtubule acetylation by tubulin acetyltransferase. *Cell* **157**, 1405–1415.

Grant, T. & Grigorieff, N. (2015) Measuring the optimal exposure for single particle cryo-EM using a 2.6 Å reconstruction of rotavirus VP6. *eLife* **4**, e06980.

Liang, B., Li, Z., Jenni, S., Rameh, A. A., Morin, B. M., Grant, T., Grigorieff, N., Harrison, S. C. & Whelan, S. P. J. (2015) Structure of the L-protein of vesicular stomatitis virus from electron cryomicroscopy. *Cell* **162**, 314–327.

Grant, T. & Grigorieff, N. (2015) Automatic estimation and correction of anisotropic magnification distortion in electron microscopes. *J. Struct. Biol.* **192**, 204–208.

Rohou, A. & Grigorieff, N. (2015) CTFFIND4: Fast and accurate defocus estimation from electron micrographs. *J. Struct. Biol.* **192**, 216–221.

Chiu, P.-L., Li, X., Li, Z., Beckett, B., Brilot, A. F., Grigorieff, N., Agard, D. A., Cheng, Y. & Walz, T. (2015) Evaluation of super-resolution performance of the K2 electron-counting camera using 2D crystals of aquaporin-0. *J. Struct. Biol.* **192**, 163–173.

Schmidt, M., Rohou, A., Lasker, K., Yadav, J. K., Schiene-Fischer, C., Fändrich, M. & Grigorieff, N. (2015) Peptide Dimer Structure in an Aβ(1-42) Fibril Visualized with Cryo-EM. *PNAS* **112**, 11858–11863.

Zhou, A., Rohou, A., Schep, D. G., Bason, J. V., Montgomery, M. G., Walker, J. E., Grigorieff, N. & Rubinstein, J. L. (2015) Structure and conformational states of the bovine mitochondrial ATP synthase by cryo-EM. *eLife* **4**, e10180.

Abeyrathne, P. D., Koh C. S., Grant, T., Grigorieff N. & Korostelev A. A. (2016) Ensemble cryo-EM uncovers inchworm-like translocation of a viral IRES through the ribosome. *eLife* **5**, e14874.

Schmidt, A., Annamalai, K., Schmidt, M., Grigorieff, N. & Fändrich, M. (2016) Cryo-EM reveals the steric zipper structure of a light chain-derived amyloid fibril. *PNAS* **113**, 6200–6205.

Laxmikanthan, G., Xu, C., Brilot, A. F., Warren, D., Steele, L., Seah, N., Tong, W., Grigorieff, N., Landy, A. & Van Duyne, G. D. (2016) Structure of a Holliday junction complex reveals mechanisms governing a highly regulated DNA transaction. *eLife* **5**, e14313.

Tajima, N., Karakas, E., Grant, T., Simorowski, N., Diaz-Avalos, R., Grigorieff, N. & Furukawa, H. (2016) Activation of NMDA receptors and the mechanism of inhibition by ifenprodil. *Nature* **534**, 63–68.

Grigorieff, N. (2016) Frealign: An exploratory tool for single particle cryo-EM. *Methods Enzymol.* **579**, 191–226.

Loveland, A. B., Bah, E., Madireddy, R., Zhang, Y., Brilot, A. F., Grigorieff, N. & Korostelev, A. A. (2016) Ribosome•RelA structures reveal the mechanism of stringent response activation. *eLife* **5**, e17029.

Oldham, M. L., Grigorieff, N., & Chen, J. (2016) Structure of the transporter associated with antigen processing trapped by herpes simplex virus. *eLife* **5**, e21829.

Liu, Y., Pan, J., Cai, Y., Grigorieff, N., Harrison, S. C. & Chen, B. (2017) Conformational states of a soluble, uncleaved HIV-1 envelope trimer. *J. Virol.* **91**, e00175–17.

Demo, G., Svidritskiy, E., Madireddy, R., Diaz-Avalos, R., Grant, T., Grigorieff, N., Sousa, D. & Korostelev, A. A. (2017) Mechanism of ribosome rescue by ArfA and RF2. *eLife* **6**, e23687.

Loveland, A. B., Demo, G., Grigorieff, N. & Korostelev, A. A. (2017) Ensemble cryo-EM elucidates the mechanism of translation fidelity. *Nature* **546**, 113–117.

Rickgauer, J. P., Grigorieff, N. & Denk, W. (2017) Single-protein detection in crowded molecular environments in cryo-EM images. *eLife* **6**, e25648.

Liu, Y., Pan, J., Jenni, S., Raymond, D. D., Caradonna, T., Do, K. T., Schmidt, A. G., Grigorieff, N. & Harrison, S. C. (2017) CryoEM structure of an influenza virus receptor-binding site antibody-antigen interface. *J. Mol. Biol.* **429**, 1829–1839.

Abeyrathne, P. D. & Grigorieff, N. (2017) Expression, purification, and contaminant detection for structural studies of Ralstonia metallidurans ClC protein rm1. *PLoS One* **12**, e0180163.

Demo, G., Rasouly, A., Vasilyev, N., Svetlov, V., Loveland, A. B., Diaz-Avalos, R., Grigorieff, N., Nudler, E. & Korostelev, A. A. (2017) Structure of RNA polymerase bound to ribosomal 30S subunit. *eLife* **6**, e28560.

Close, W., Neumann, M., Schmidt, A., Hora, M., Annamalai, K., Schmidt, M., Reif, B., Schmidt, V., Grigorieff, N. & Fändrich, M. (2018) Physical basis of amyloid fibril polymorphism. *Nature Commun*. **9**, 699.

Grant, T., Rohou, A. & Grigorieff, N. (2018) *cis*TEM, User-friendly software for single-particle image processing. *eLife* **7**, e35383.

Bartesaghi, A., Aguerrebere, C., Falconieri, V., Banerjee, S., Earl, L. A., Zhu, X., Grigorieff, N., Milne, J. L. S., Sapiro, G., Wu, X. & Subramaniam, S. (2018) Atomic resolution cryo-EM structure of β-galactosidase. *Structure*, **26**, 848–856.

Regan, M. C., Grant, T., McDaniel, M. J., Karakas, E., Zhang, J., Traynelis, S. F., Grigorieff, N. & Furukawa, H. (2018) Structural mechanism of functional modulation by gene splicing in NMDA receptors. *Neuron*, **98**, 521–529.

Vemu, A., Szczesna, E., Zehr, E. A., Spector, J. O., Grigorieff, N., Deaconescu, A. M. & Roll-Mecak, A. (2018) Severing enzymes amplify microtubule arrays through lattice GTP-tubulin incorporation. *Science* **361**, 768–779.

Zhang, C., Cantara, W., Jeon, Y., Musier-Forsyth, K., Grigorieff, N. & Lyumkis, D. (2019) Analysis of discrete local variability and structural covariance in macromolecular assemblies using cryo-EM and focused classification. *Ultramicroscopy*, **203**, 170–180.

Liberta, F., Loerch, S., Rennegarbe, M., Schierhorn, A., Westermark, P., Westermark, G. T., Hazenberg, B. P. C., Grigorieff, N., Fändrich, M. & Schmidt, M. (2019) Cryo-EM fibril structures from systemic AA amyloidosis reveal the species complementarity of pathological amyloids. *Nature Comm.*, **10**, 1104.

Jung, J., Grant, T., Thomas, D. R., Diehnelt, C. W., Grigorieff, N. & Joshua-Tor, L. (2019) High-resolution cryo-EM structures of outbreak strain human norovirus shells reveal size variations. *PNAS*, **116**, 12828–12832.

Jenni, S., Salgado, E. N., Herrmann, T., Li, Z., Grant, T., Grigorieff, N., Trapani, S., Estrozi, L. F. & Harrison, S. C. (2019) In situ structure of rotavirus VP1 RNA-dependent RNA polymerase. *J. Mol. Biol.*, **431**, 3124–3138.

Song, K., Shang, Z., Fu, X., Lou, X., Grigorieff, N. & Nicastro, D. (2019) In situ structure determination at nanometer 1 resolution using TYGRESS. *Nature Methods,* **in press**.

Syrjanen, J. L., Michalski, K., Chou, T.-H., Grant, T., Rao, S., Simorowski, N., Tucker , S. J., Grigorieff, N. & Furukawa, H. (2019) Structure and assembly of calcium homeostasis modulator proteins. *Nature Struct. Mol. Biol.,* **in press**.

Jenni, S., Bloyet, L.-M., Diaz-Avalos, R., Liang, B., Whelan, S. P. J., Grigorieff, N. & Harrison, S. C. (2019) Structure of the Vesicular Stomatitis Virus L protein in complex with its phosphoprotein cofactor, *Cell Reports,* **in press**.

PRE-PRINTS

Zehr, E. A., Rohou, A., Liu, Y., Verba, K. A., Pogliano, J., Grigorieff, N. & Agard, D. A. (2018) Mechanistic origins of dynamic instability in filaments from the phage tubulin, PhuZ. *bioRxiv* **doi.org/10.1101/311498**.

Liberta, F., Loerch, S., Rennegarbe, M., Schierhorn, A., Westermark, P., Westermark, G. T., Grigorieff, N., Fändrich, M. & Schmidt, M. (2018) Cryo-EM structure of an amyloid fibril from systemic amyloidosis. *bioRxiv* **doi.org/10.1101/357129**.

Song, K., Shang, Z., Fu, X., Lou, X., Grigorieff, N. & Nicastro, D. (2018) Structure of the ciliary axoneme at nanometer resolution reconstructed by TYGRESS. *bioRxiv* **doi.org/10.1101/363317**.

Zhang, C., Cantara, W., Jeon, Y., Musier-Forsyth, K., Grigorieff, N. & Lyumkis, D. (2018) Analysis of local variability and allostery in macromolecular assemblies using cryo-EM and focused classification. *bioRxiv* **doi.org/10.1101/365940**.

Jenni, S., Bloyet, L.-M., Diaz-Avalos, R., Liang, B., Whelan, S. P. J., Grigorieff, N. & Harrison, S. C. (2019) Structure of the vesicular stomatitis virus L protein in complex with its phosphoprotein cofactor. *bioRxiv* **doi.org/10.1101/792960**.

REVIEWS

Walz, T. & Grigorieff. N (1998) Electron crystallography of two-dimensional crystals of membrane proteins. *J. Struct. Biol.* **121**, 142–161.

Grigorieff, N. (1999) Structure of the respiratory NADH:ubiquinone oxidoreductase (complex I). *Curr. Opinion Struct. Biol*. **9**, 476–483.

Nogales, E. & Grigorieff, N. (2001) Molecular machines: Putting the pieces together. *J. Cell Biol.* 152, F1–F10.

Sachse, C., Grigorieff, N. & Fändrich, M. (2009) Elektronenmikroskopie an Alzheimer-Fibrillen. *Bioforum* **32**, 26–28.

Fändrich, M., Meinhardt, J. & Grigorieff, N. (2009) Structural polymorphism of Alzheimer Aβ and other amyloid fibrils. *Prion* **3**, 89–93.

Grigorieff, N. & Harrison, S. C. (2011) Near-atomic resolution reconstructions of icosahedral viruses from electron cryo-microscopy. *Curr. Opinion Struct. Biol.* **21**, 265–273.

Fändrich, M., Schmidt, M. & Grigorieff, N. (2011) Recent progress in understanding Alzheimer's β-amyloid structures. *Trends Biochem. Sci.* **36**, 338–345.

Deaconescu, A. M., Artsimovitch, I. & Grigorieff, N. (2012) Interplay of DNA repair with transcription: from structures to mechanisms. *Trends Biochem. Sci.* **37**, 543–552.

Grigorieff, N. (2013) Direct detection pays off for electron cryo-microscopy. *eLife* **2**, e00573.

Grigorieff, N. (2015) Paper of the year award 2015. *J. Struct. Biol.* **189**, 161–162.

Cheng, Y., Grigorieff, N., Penczek, P. A. & Walz, T. (2015) A Primer to single-particle cryo-electron microscopy. *Cell* **161**, 438–449.

OTHER GRIGORIEFF-LAB RESEARCH PUBLICATIONS

Kutter, S., Eichner, T., Deaconescu, A. M. & Kern, D. (2016) Regulation of Microtubule Assembly by Tau and not by Pin1. *J. Mol. Biol.* **428**, 1742–1759.

Abeyrathne, P. D., Chami, M., & Stahlberg. H. (2016) Biochemical and biophysical approaches to study the structure and function of the chloride channel (ClC) family of proteins. *Biochimie* **128-129**, 154–162.

Mazhab-Jafari, M. T., Rohou, A., Schmidt, C., Bueler, S. A., Benlekbir, S., Robinson, C. V. & Rubinstein, J. L. (2016) Atomic model for the membrane-embedded VO motor of a eukaryotic V-ATPase. *Nature* **539**, 118–122.

Coudray, N., Seyler, S., Lasala, R., Zhang, Z., Clark, K. M., Dumont, M. E., Rohou, A., Beckstein, O. & Stokes, D. L. (2016) Structure of the SLC4 transporter Bor1p in an inward-facing conformation. *Protein Sci.* **26**, 130–145.

Zehr, E., Szyk, A., Piszczek, G., Szczesna, E., Zuo, X. & Roll-Mecak, A. (2017) Katanin spiral and ring structures shed light on power stroke for microtubule severing. *Nature Struct. Mol. Biol.* **24**, 717–725.

Loerch, S., De La Peña, J. B., Song, J., Pancrazio, J. J., Price, T. J. & Campbell, Z. T. (2019) Translational controls in pain. *Oxford Handbook of Neuronal Protein Synthesis*, **in press**.