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EDUCATION

2005-2011	**UNIVERSITY OF CALIFORNIA, SAN FRANCISCO** **Ph.D. Cell Biology**
1999 -2003	**UNIVERSITY OF CALIFORNIA, BERKELEY** **B.A. Molecular and Cell Biology**

RESEARCH AND PROFESSIONAL EXPERIENCE

2020-present	***Junior Fellow**,* Technical University of Munich
2019-present	***Principal Investigator,*** Helmholtz Pioneer Campus We are using focused ion beam milling and cryo-electron tomography to study the in situ structural biology of macromolecules within native-state frozen cellular environments.
2011-2019	***Postdoc**, Wolfgang Baumeister,* MPI of Biochemistry Project Group Leader 2016-2019
2010	***Visiting Scientist**, Ritsu Kamiya,* University of Tokyo I used electron microscopy to study the structure of cilia.
2005-2011	***Graduate Student**, Wallace Marshall,* UC San Francisco I studied the relationship between intraflagellar transport and flagellar length control.
2001-2005	***Research Associate**, Carolyn Larabell,* Lawrence Berkeley National Laboratory I studied cellular defense mechanisms during the early stages of breast cancer metastasis.
1998-2001	***Student Intern**, Advanced Light Source,* Lawrence Berkeley National Laboratory

FUNDING AND AWARDS

2020	***EMBO Young Investigator***
2017-2020	***DFG Grant FOR2092: Biogenesis of Thylakoid Membranes**,* MPI of Biochemistry
2015	***Junior Research Award**,* MPI of Biochemistry
2011-2013	***Alexander von Humboldt Foundation Research Fellowship**,* MPI of Biochemistry
2010	***NSF East Asia and Pacific Summer Institutes (EAPSI) Fellowship***, University of Tokyo
2008-2009	***Genentech Graduate Fellowship***, UC San Francisco
2003	***Departmental Honors***, Molecular and Cell Biology, UC Berkeley

MENTORING AND TEACHING

2014-present	***Supervisor**,* 4 postdocs, 5 graduate students (https://www.cellarchlab.com/people.html*)*
Nov 2020	***Guest Lecturer***, Structural biology graduate course; University of Basel, Switzerland
Feb 2020	***Instructor**,* Vienna BioCenter Cryo-EM Winter School; Vienna, Austria
May 2019	***Instructor**,* Advanced Workshop on Cryo-Electron Tomography; Vienna, Austria
2005-2009	***Research Mentor and Classroom Teacher**,* UCSF Science and Education Partnership

INVITED TALKS

Feb 2021	Virtual Seminar; University of Liverpool, UK
Jan 2021	Virtual Seminar; CNRS-IBMP, Strasbourg, France
Dec 2020	Virtual Seminar; Washington University, St. Luis, MO, USA

Oct 2020	Virtual Seminar; Stockholm University, Sweden
Jun 2020	Virtual Seminar; DKFZ-ZMBH Alliance Colloquium; Heidelberg, Germany
Feb 2020	MPI of Biophysical Chemistry guest lecture; Göttingen, Germany
Jan 2020	3D Electron Microscopy of Organelles and Macromolecules, CUHK; Hong Kong, China
Dec 2019	Plenary talk; Christmas Bioenergetics Meeting; London, United Kingdom
Oct 2019	Institut Curie seminar series; Paris, France
Oct 2019	MRC Laboratory of Molecular Biology guest lecture; Cambridge, United Kingdom
Jul 2019	SFB924 Colloquium; Freising, Germany
Jun 2019	Vrije Universiteit guest lecture; Amsterdam, the Netherlands
May 2019	Université Libre de Bruxelles guest lecture; Brussels, Belgium
Apr 2019	BiteSizeBio Webinar: Cryo-electron Tomography for Cell Biology *https://bitesizebio.com/webinar/cryo-electron-tomography-for-cell-biology/*
Mar 2019	Life Sciences Institute seminar series; Ann Arbor, MI, USA
Nov 2018	University of Vienna MFPL guest lecture; Vienna, Austria
Nov 2018	CNRS Aviesan meeting on How Cryo-EM meets Chemical Structure; Paris, France
Oct 2018	International Conference on Physics and Biological Systems; Gif-sur-Yvette, France
Oct 2018	Keynote speaker; Ohio State Cryo-EM for Cancer workshop, Columbus, OH, USA
Sep 2018	Molecular Horizons seminar; Wollongong, Australia
Sep 2018	International Microscopy Congress; Sydney, Australia
Sep 2018	NTU guest lecture; Singapore
Aug 2018	ETH guest lecture; Zurich, Switzerland
Aug 2018	Keynote speaker; ETH/PSI/Univ. Zurich BSM grad student retreat; Morschach, Switzerland
Jun 2018	International Chlamydomonas Conference; Washington, DC, USA
Jun 2018	Princeton special seminar; Princeton, NJ, USA
Jun 2018	Gordon Research Conference on 3D Electron Microscopy; Newport, RI, USA
May 2018	MPI for Terrestrial Microbiology guest lecture; Marburg, Germany
Jan 2018	UCLA-DOE Institute guest lecture; Los Angeles, CA, USA
Jan 2018	Western Photosynthesis Conference; Oracle, AZ, USA
Nov 2017	CEA guest lecture; Grenoble, France
Aug 2017	German/Austrian/Swiss Microscopy Conference; Lausanne, Switzerland
Jul 2017	Gordon Research Conference on Photosynthesis; Newry, MN, USA
Jul 2017	French Society of Microscopy; Bordeaux, France
Jun 2017	Symposium on Chloroplast Metabolism and Photosynthesis; Neuchâtel, Switzerland
Jun 2017	French Photosynthesis Society; Paris, France
Mar 2017	SFB 1208 Retreat; Schleiden, Germany
Nov 2016	University of Jena botanical colloquium; Jena, Germany
Oct 2016	Nordic Photosynthesis Congress; Copenhagen, Denmark
Aug 2016	International Congress of Photosynthesis; Maastricht, the Netherlands
Jun 2016	International Chlamydomonas Conference; Kyoto, Japan
Mar 2016	Michigan State Plant Research Laboratory seminar series; Lansing, MI, USA
Dec 2015	American Society for Cell Biology minisymposium; San Diego, CA, USA
Oct 2015	University of Sheffield molecular biology seminar series; Sheffield, United Kingdom
Jul 2015	Gordon Research Conference on Photosynthesis; Waltham, MA, USA

PUBLICATIONS ***indicates corresponding author** (https://www.cellarchlab.com/publications.html)

Kumar Gupta T, Klumpe S, Gries K, Heinz S, Wietrzynski W, Ohnishi N, Niemeyer J, Schaffer M, Rast A, Strauss M, Plitzko JM, Baumeister W, Rudack T, Sakamoto W, Nickelsen J*, Schuller JM*, Schroda M*, **Engel BD*** (2020). Structural basis for VIPP1 oligomerization and maintenance of thylakoid membrane integrity. *bioRxiv*. 2020.08.11.243204.

He S, Chou H-T, Matthies D, Wunder T, Meyer MT, Atkinson N, Martinez-Sanchez A, Jeffrey PD, Port SA, Patena W, He G, Chen VK, Hughson FM, McCormick SJ, Mueller-Cajar O, **Engel BD**, Yu Z, Jonikas MC (2020). The structural basis of Rubisco phase separation in the pyrenoid. *Nature Plants.* 6: 1480–1490.

Klena N, Le Guennec M, Tassin A-M, *van den Hoek H*, Erdmann PS, Schaffer M, Geimer S, Kovacik L, Goldie KN, Stahlberg H, **Engel BD***, Hamel V, Guichard P (2020). Probing the evolutionary conservation of the centriole cartwheel-containing region by cryo-electron tomography. *EMBO Journal.* 39: e106246.

Wietrzynski W, Schaffer M, Tegunov D, Albert S, Kanazawa A, Plitzko JM, Baumeister W, **Engel BD*** (2020). Charting the native architecture of Chlamydomonas thylakoid membranes with single-molecule precision. *eLife*. 9: e53740.

Le Guennec M, Klena N, Gambarotto D, Laporte MH, Tassin AM, van den Hoek H, Erdmann PS, Schaffer M, Kovacik L, Borgers S, Goldie KN, Stahlberg H, Bornens M, Azimzadeh J, **Engel BD***, Hamel V, Guichard P (2020). A helical inner scaffold provides a structural basis for centriole cohesion. *Science Advances*. 6: eaaz4137.

Theis J, Niemeyer J, Schmollinger S, Ries F, Rütgers M, Gupta TK, Sommer F, Muranaka LS, Venn B, Schulz-Raffelt M, Willmund F, **Engel BD**, Schroda M (2020). VIPP2 interacts with VIPP1 and HSP22E/F at chloroplast membranes and modulates a retrograde signal for HSP22E/F gene expression. *Plant, Cell & Environment*. 43: 1212-1229.

Albert S, Wietrzynski W, Lee CW, Schaffer M, Beck F, Schuller JM, Salomé PA, Plitzko JM, Baumeister W, **Engel BD*** (2020). Direct visualization of degradation microcompartments at the ER membrane. *Proceedings of the National Academy of Sciences USA.* 117: 1069-1080.

Craig EW, Mueller DM, Bigge BM, Schaffer M, **Engel BD**, Avasthi P* (2019). The elusive actin cytoskeleton of a green alga expressing both conventional and divergent actins. *Molecular Biology of the Cell*. 30: 2827-2837.

Schaffer M, Pfeffer S, Mahamid J, Kleindiek S, Laugks T, Albert S, **Engel BD**, Rummel A, Smith AJ, Baumeister W, Plitzko JM (2019). A cryo-FIB lift-out technique enables molecular-resolution cryo-ET within native Caenorhabditis elegans tissue. *Nature Methods*. 16: 757-762.

Theis J, Kumar Gupta T, Klingler J, Wan W, Albert S, Keller S, **Engel BD***, Schroda M (2019). VIPP1 rods engulf membranes containing phosphatidylinositol phosphates. *Scientific Reports.* 9: 8725.

Rast A, Schaffer M, Albert S, Wan W, Pfeffer S, Beck F, Plitzko JM, Nickelsen J, **Engel BD*** (2019). Biogenic regions of cyanobacterial thylakoids form contact sites with the plasma membrane. *Nature Plants*. 5: 436-446.

Chicano A, Crosas E, Otón J, Melero R, **Engel BD**, Daban JR (2019). Frozen-hydrated chromatin from metaphase chromosomes has an interdigitated multilayer structure. *The EMBO Journal*. 38: e99769.

Schuller JM, Birrell JA, Tanaka H, Konuma T, Wulfhorst H, Cox N, Schuller SK, Thiemann J, Lubitz W, Sétif P, Ikegami T, **Engel BD**, Kurisu G, Nowaczyk MM (2019). Structural adaptations of photosynthetic complex I enable ferredoxin-dependent electron transfer. *Science*. 363:257-260.

Kovtun O, Leneva N, Bykov YS, Ariotti N, Teasdale RD, Schaffer M, **Engel BD**, Owen DJ, Briggs JAB, Collins BM (2018). Structure of the membrane-assembled retromer coat by cryo-electron tomography. *Nature*. 561: 561-564.

Delarue M, Brittingham GP, Pfeffer S, Surovtsev IV, Pinglay S, Kennedy KJ, Schaffer M, Gutierrez JI, Sang D, Poterewicz G, Chung JK, Plitzko JM, Groves JT, Jacobs-Wagner C, **Engel BD***, Holt LJ (2018). mTORC1 controls phase separation and the biophysical properties of the cytoplasm by tuning crowding. *Cell*. 174: 338-349.e320.

Mosalaganti S, Kosinski J, Albert S, Schaffer M, Strenkert D, Salomé PA, Merchant SS, Plitzko JM, Baumeister W, **Engel BD***, Beck M (2018). In situ architecture of the algal nuclear pore complex. *Nature Communications*. 9: 2361.

Albert S, Schaffer M, Beck F, Mosalaganti S, Asano S, Thomas HF, Plitzko JM, Beck M, Baumeister W, **Engel BD*** (2017). Proteasomes tether to two distinct sites at the nuclear pore complex. *Proceedings of the National Academy of Sciences USA.* 114: 13726-13731.

Bykov YS, Schaffer M, Dodonova SO, Albert S, Plitzko JM, Baumeister W, **Engel BD***, Briggs JAG (2017). The structure of the COPI coat determined within the cell. *eLife*. 6: e32493.

Freeman Rosenzweig ES, Xu B, Kuhn Cuellar L, Martinez-Sanchez A, Schaffer M, Strauss M, Cartwright HN, Ronceray P, Plitzko JM, Förster F, Wingreen NS, **Engel BD***, Mackinder LCM, Jonikas MC (2017). The Eukaryotic CO2-Concentrating Organelle Is Liquid-like and Exhibits Dynamic Reorganization. *Cell*. 171: 148-162.e19.

Albanese P, Melero R, **Engel BD**, Grinzato A, Berto P, Manfredi M, Chiodoni A, Vargas J, Sorzano CÓS, Marengo E, Saracco G, Zanotti G, Carazo JM, Pagliano C (2017). Pea PSII-LHCII supercomplexes form pairs by making connections across the stromal gap. *Scientific Reports.* 7: 10067.

Pfeffer S, Dudek J, Schaffer M, Ng BG, Albert S, Plitzko JM, Baumeister W, Zimmermann R, Freeze HH, **Engel BD***, Förster F (2017). Dissecting the molecular organization of the translocon-associated protein complex. *Nature Communications.* 8: 14516.

Schaffer M, Mahamid J, **Engel BD**, Laugks T, Baumeister W, Plitzko J (2017). Optimized cryo-focused ion beam sample preparation aimed at in situ structural studies of membrane proteins. *Journal of Structural Biology.* 197: 73-82.

Asano S, **Engel BD**, Baumeister W (2016). In situ cryo-electron tomography: a post-reductionist approach to structural biology. *Journal of Molecular Biology.* 428: 332-343.

Engel BD*, Schaffer M, Albert S, Asano S, Plitzko JM, Baumeister W (2015). In situ structural analysis of Golgi intracisternal protein arrays*. Proceedings of the National Academy of Sciences USA.* 112: 11264-11269.

Schaffer M, **Engel BD**, Laugks T, Mahamid J, Plitzko JM, Baumeister W (2015). Cryo-focused ion beam sample preparation for imaging vitreous cells by cryo-electron tomography. *Bio-protocol.* 5: e1575.

Engel BD*, Schaffer M, Cuellar LK, Villa E, Plitzko JM, Baumeister W (2015). Native architecture of the Chlamydomonas chloroplast revealed by in situ cryo-electron tomography. *eLife.* 4: e04889.

Bhogaraju S, Weber K, **Engel BD**, Lechtreck KF, Lorentzen E (2014). Getting tubulin to the tip of the cilium: one IFT train, many different tubulin cargo-binding sites? *Bioessays.* 36: 463-467.

Bhogaraju S, **Engel BD**, Lorentzen E (2013). Intraflagellar transport complex structure and cargo interactions. *Cilia.* 2: 10.

Shih SM, **Engel BD**, Kocabas F, Bilyard T, Gennerich A, Marshall WF, Yildiz A (2013). Intraflagellar transport drives flagellar surface motility. *eLife.* 2: e00744.

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Mizuno N, Taschner M, **Engel BD**, Lorentzen E (2012). Structural studies of ciliary components. *Journal of Molecular Biology.* 422: 163-180.

Engel BD, Ishikawa H, Feldman JL, Wilson CW, Chuang PT, Snedecor J, Williams J, Sun Z, Marshall WF (2011). A cell-based screen for inhibitors of flagella-driven motility in Chlamydomonas reveals a novel modulator of ciliary length and retrograde actin flow. *Cytoskeleton.* 68: 188-203.

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REFERENCES

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