

Gia K. Voeltz

Professor

Department of Molecular, Cellular, and Developmental Biology
HHMI - University of Colorado at Boulder

I. EDUCATION.

- 1994 **B.A.** Biochemistry & Molecular Biology. University of California at Santa Cruz, CA.
2001 **Ph.D.** Molecular Biophysics & Biochemistry. Yale University, New Haven, CT.

II. ACADEMIC EMPLOYMENT HISTORY.

- 1994-1995 **Research Assistant.**
Dept of Biochemistry & Molecular Biology. University of California at Santa Cruz, CA.
Advisor: Dr. Manuel Ares Jr.
- 1995-2001 **PhD Student**
Dept of Molecular Biophysics & Biochemistry. Yale University, New Haven, CT.
Advisor: Dr. Joan Steitz.
- 2001-2006 **Postdoctoral Associate**
Jane Coffin Childs Postdoctoral Fellow
Dept of Cell Biology, Harvard Medical School, Boston, MA.
Advisor: Dr. Tom Rapoport.
- 2006-2013 **Assistant Professor**
Department of Molecular, Cellular & Developmental Biology
University of Colorado at Boulder, CO, U.S.A.
- 2013-2017 **Associate Professor**
Department of Molecular, Cellular & Developmental Biology
University of Colorado at Boulder, CO, U.S.A.
- 2017-pres **Professor**
Department of Molecular, Cellular & Developmental Biology
University of Colorado at Boulder, CO, U.S.A.
- 2018-pres **Investigator**
Howard Hughes Medical Institute
University of Colorado at Boulder, CO, U.S.A.

RESEARCH INTERESTS:

I am a Howard Hughes Investigator and a Professor in the Department of Molecular, Cellular and Developmental Biology at the University of Colorado, Boulder. I received my PhD from Yale University in the lab of Dr. Joan Steitz where I studied the regulation of mRNA deadenylation and decay. I was a postdoctoral fellow in the lab of Dr. Tom Rapoport at Harvard Medical School where discovered the first class of integral membrane proteins (the Reticulons) that determines the structure of the tubular endoplasmic reticulum (ER) both in vitro and in vivo, in yeast and mammalian cells. My own lab is interested in understanding how ER structure and dynamics are regulated and the role of ER contact sites in regulating the structure of other organelles in health and disease.

Over the past several years our research has revealed surprising roles for ER contact in defining the position where mitochondria, endosomes and even membrane-less organelles like RNP granules undergo constriction and division. On mitochondria, we have further discovered that both fusion and fission machineries co-localize to the same ER contact sites that we refer to as dynamic nodes. Our

current research goals are aimed at unraveling the factors, functions, and mechanisms of ER-mediated organelle constriction, fission and fusion. Furthermore, I anticipate that our studies will be of general importance and could forge a link between basic biology and disease. For example, we are studying how ER shaping proteins contribute to viral replication center formation and are probing whether ER contact sites serve as conduits for RNA virus trafficking through cytoplasmic organelles. We are also studying how ER patterning by membrane shaping proteins during neuronal differentiation and growth guides the distribution of the associated microtubules and other organelles in health and disease.

III. FELLOWSHIPS, AWARDS and HONORS.

- 1994 Graduated with High Honors. University of California at Santa Cruz
- 1996 NIH Pre-doctoral Training Grant
- 2001 Jane Coffin Childs Postdoctoral Fellowship Award
- 2007 Searle Scholar Early Career Award
- 2008 Interviewed for article: "Gia Voeltz: Shaping ideas about ER shape" by K. Sedwick (2008) *Journal of Cell Biology*, 180: p4-5.
- 2009 Interviewed for article: "Cell Biology: Ahead of the Curve" by K. Powell (2009) *Nature* 460: p318.
- 2012 My PhD student Jonathan Friedman wins a Weintraub Award.
- 2012 American Society for Cell Biology (ASCB) Early Career Life Scientist Award
- 2012 Provost's Faculty Achievement Award, CU Boulder
- 2013 American Cancer Society Research Scholar Award
- 2014 Member, NIH Membrane Biology and Protein Processing Study Section (until 2020)
- 2014 Associate Editor, *Molecular Biology of the Cell* (until present)
- 2014 Elected Chair of MCD Biology Graduate Program, CU Boulder (3 year term).
- 2015 Featured in article: "Meet 10 scientists who are making their mark" by Megan Rosen (2015) *Science News*, 188: p.20.
- 2015 Featured in article: "Gia Voeltz: Cellular Cartographer" by Karen Zusi (Dec 2015) *The Scientist*.
- 2015 American Society for Cell Biology Porter Lecture Fellowship Award
- 2016 Recipient of an HHMI Faculty Scholar Award
- 2018 Appointed an Investigator of the Howard Hughes Medical Institute
- 2019 IBiology Video Part I & 2.
- 2020 Editorial Board Member, *Cell* (until present)
- 2022 Elected Chair of MCD Biology Graduate Program, CU Boulder (3 year term).
- 2023 Elected a Member of the National Academy of Sciences.
- 2023 Elected a Fellow of the American Society of Cell Biology

IV. SELECTED PUBLICATIONS (*denotes corresponding author)

- Striepen JF & Voeltz GK* (2023) Endosome biogenesis is controlled by ER and the cytoskeleton at tripartite junctions. ***Curr Opin Cell Biol.*** PMID: 36848759.
- Nguyen TT & Voeltz GK* (2022) An ER phospholipid hydrolase drives ER-associated mitochondrial constriction for fission and fusion. ***ELife***: e84279. PMID: 36448541.
- Striepen JF & Voeltz GK* (2022) Coronin 1C restricts endosomal branched actin to organize ER contact and endosome fission. ***Journal of Cell Biology***: 221(8): e202110089.
- Zamponi E, Meehl JB & Voeltz GK* (2022) The ER ladder is a unique morphological feature of developing mammalian axons. ***Developmental Cell***: 57: 1369-1382.
- Wu H & Voeltz GK*. (2021) Reticulon-3 promotes endosome maturation at ER membrane contact sites. ***Developmental Cell*** 56: 52-66.
- Westrate LM, Hoyer MJ, Nash MJ & Voeltz GK* (2020) Vesicular and uncoated Rab1-dependent cargo carriers facilitate ER to Golgi transport. ***Journal of Cell Science***: 133(14): jcs239814.
- Lee JE, Cathey PI, Wu H, Parker R & Voeltz GK* (2020) Endoplasmic reticulum contact sites regulate the dynamics of membrane-less organelles. ***Science***: 367(6477).
- Abrisch RG, Gumbin SC, Wisniewski BT, Lackner LL & Voeltz GK* (2020) Fission and fusion machineries converge at ER membrane contact sites to regulate mitochondrial morphology. ***Journal of Cell Biology***: 219 (4): e201911122.
- Wu H, Carvalho P* & Voeltz GK* (2018) Here, there, and everywhere: The importance of ER membrane contact sites. ***Science*** 361.
- Hoyer MJ, Chitwood P, Ebmeier C, Striepen J, Qi R, Old W & Voeltz GK* (2018) A novel class of ER membrane proteins regulates ER-associated endosome fission. ***Cell*** 175: 254-265.
- Lackner LL* & Voeltz GK* (2017) The mechanisms and functions of interorganelle interactions. ***Molecular Biology of the Cell*** 28: 703-4.
- Salvador-Gallego R, Hoyer MJ & Voeltz GK* (2017) SnapShot: Functions of Endoplasmic Reticulum Membrane Contact Sites. ***Cell*** 171: 1224.
- Phillips MJ & Voeltz GK* (2016) Structure and function of ER membrane contact sites with other organelles. ***Nature Reviews Molecular Cell Biology*** 17: 69-82.
- Lee JE, Westrate LM, Wu H, Page C & Voeltz GK* (2016) Multiple Dynamin family members collaborate to drive mitochondrial division. ***Nature*** 540: 139-143.
- Westrate LM, Lee JE, Prinz WA & Voeltz GK* (2015) Form follows function. The importance of Endoplasmic Reticulum shape. ***Annual Review of Biochemistry*** 84: 791-811.
- Rowland AA, Chitwood P, Phillips MJ & Voeltz GK* (2014) ER contact sites define the position and timing of endosome fission. ***Cell*** 159: 1027-41.
- Voeltz G* & Cheeseman I* (2013). Building a path in cell biology. ***Molecular Biology of the Cell*** 23: 4145-7.

- English AR & Voeltz GK* (2013). Rab10 GTPase regulates ER dynamics and morphology. ***Nature Cell Biology*** 15: 169-78.
- Friedman JR, DiBenedetto JR, West M, Rowland AA & Voeltz GK* (2013). ER-endosome contact increases as endosomes traffic and mature. ***Molecular Biology of the Cell*** 24:1030-40.
- English AR & Voeltz GK* (2013). ER structure and interconnections with other organelles. Perspective chapter for a monograph book “Endoplasmic Reticulum”, ***CSH Perspective in Biology***.
- Murley A, Lackner LL, Osman C, West M, Voeltz GK, Walter P & Nunnari J* (2013). ER-associated mitochondrial division links the distribution of mitochondria and mitochondrial DNA in yeast. ***Elife*** 2: e00422.
- Rowland AA & Voeltz GK* (2012). Endoplasmic reticulum-mitochondria contacts: function of the junction. ***Nature Reviews: MCB***, 13: 607-615.
- Friedman JR, Lackner LL, West M, DiBenedetto JR, Nunnari J & Voeltz GK* (2011). ER Tubules Mark Sites of Mitochondrial Division. ***Science*** 334: 358-362.
- Friedman JR & Voeltz GK* (2011). The ER in 3D: a multifunctional dynamic membrane network. ***Trends in Cell Biology***, 21: 709-717.
- Zurek N, Sparks L & Voeltz G* (2011). Reticulon short hairpin transmembrane domains are used to shape ER tubules. ***Traffic*** 12: 28-41.
- West M, Zurek N, Hoenger A & Voeltz GK* (2011). A 3-D analysis of yeast ER structure reveals how ER domains are organized by membrane curvature. ***Journal of Cell Biology***, 193: 333-346.
- Friedman JR⁺, Webster BM⁺, Mastronarde, DN, Verhey KJ & Voeltz GK* (2010). ER sliding dynamics and ER-mitochondrial contacts occur on acetylated microtubules. ***Journal of Cell Biology***, 190: 363-375. (*co-first authors)
- English AR⁺, Zurek N⁺ & Voeltz GK* (2009). Peripheral ER structure and function. ***Current Opinion in Cell Biology***, 21: 596-602. (*co-first authors)
- Shibata Y⁺, Voss C⁺, Rist JM, Hu J, Rapoport TA, Prinz WA* & Voeltz GK* (2008). The reticulon and DP1/Yop1p proteins form immobile oligomers in the tubular endoplasmic reticulum. ***Journal of Biological Chemistry***, 283: 18892-904. (*co-first authors)
- Kiseleva E, Morozova KN, Voeltz GK, Allen TD & Goldberg MW* (2007). Reticulon 4a/NogoA locates to regions of high membrane curvature and has a role in nuclear envelope growth. ***Journal of Structural Biology*** 160: 224-35.
- Voeltz, GK* & Prinz WA (2007). Sheets, ribbons and tubules — how organelles get their shape. ***Nature Reviews: MCB***, 8: 258-264.
- Shibata Y, Voeltz GK, & Rapoport TA* (2006). Rough sheets and smooth tubules. ***Cell*** 126: 435-9.
- Voeltz GK, Prinz WA, Shibata Y, Rist JM & Rapoport TA* (2006). A class of membrane proteins shaping the tubular endoplasmic reticulum. ***Cell***, 124: 573-586.