William M. Rosencrans

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Cell: (516) 606-5532

EDUCATION

Doctor of Philosophy (Ph.D), Biochemistry and Molecular Biophysics, California Institute of Technology (Caltech), Pasadena, CA — June 2025

Bachelor of Arts, Colgate University, Hamilton, NY — *May 2019*

Magna cum laude

Majored in *Physics with a minor in Biology*

Exchange Student, National University of Singapore, Singapore — *May 2017-December 2017*

Positions

2025	NIH IRTA Post-Doctoral Fellow (Adviser: Richard Youle), National Institute of Neurological Disorders and Stroke, Bethesda, MD
2020-2025	NIH IRTA Graduate Researcher (Advisers: David Chan, Tsui-Fen Chou, Richard Youle), California Institute of Technology, Pasadena, CA
2019-2020	NIH IRTA Post-Baccalaureate Fellow (Advisers: Sergey Bezrukov, Tatiana Rostovtseva), National Institutes of Child Health and Human Development, Bethesda, MD
2017	Visiting Undergraduate Researcher (Adviser: Johan Van Der Maarel), National University of Singapore, Singapore
2015-2019	Undergraduate Research Assistant (Adviser: Engda Hagos), Colgate University, Hamilton, NY
2013-2015	High School Research Assistant (Adviser: Theodore Brummel), Long Island University, Brookville, NY

RESEARCH EXPERIENCE

Center for Alzheimer's and Related Dementias (CARD), NINDS, NIH — June 2021 -Present

PI: Dr. Richard Youle

- Proposed and led a small-molecule drug discovery program aimed at creating an AutoTAC
- Currently lead a team of technicians, PhD students, Post-docs and CRO's to carry out a comprehensive drug discovery program
- Carried out a hit to lead study identifying the first ligands to our protein drug target
- Solved the first crystal-structure of our target bound to a small molecule ligand
- Developed sub-micromolar ligands to the autophagy initiation complex capable of rewiring autophagy
- Identified a Golgi to Lysosome degradation pathway that mediates the suppression of innate imune signaling effector STING

Division of Biology and Biological Engineering, Caltech — September 2020 -June 2025

PI: Dr. Tsui-Fen Chou and Dr. David Chan

- Characterized the mechanism of action of two clinical stage mitophagy activating small molecules, identifying a conserved pathway leading to mitophagy activation and off-target toxicity
- Discovered and biophysically characterized the lipid tethering properties of the autophagy scaffolding protein, FIP200.
- Developed novel Mass-Spectrometry methods for characterizing organelle trafficking pathways
- Utilized x-ray crystallography and protein NMR to determine ligand binding sites for compounds

Post-baccalaureate Researcher (IRTA), Section on Molecular Transport, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, NIH — *June 2019-August 2020*

PI: Sergey Bezrukov, PhD

- Assessed the basic channel properties of the Voltage Dependent Anion Channel 2 (VDAC2) and its interaction with pathogenic protein alpha synuclein
- Assessed the calcium transport properties of VDAC isoforms, mutants, and complexes

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- Determined the effect of novel anti-arrhythmic compound Efsevin on VDAC2 channel function

Special Volunteer, Section on Molecular Transport, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, NIH *May 2018-December 2018*
PI: Sergey Bezrukov, PhD

- Investigated potential therapeutic compounds and peptides on mitochondrial membrane and channel function
- Assessed the potential of synthetic neuroprotective drug Olesoxime on modifying VDAC function and interaction with Alpha Synuclein in the context of Parkinson's disease
- Performed single molecule electrophysiology, synthetic bilayer preparation, membrane channel reconstitution, Bilayer Overtone Analysis
- Developed statistical physics based modelling and data analysis pipelines for single-channel experiments

Lab Assistant, Lab of Cancer Biology, Dept. of Biology, Colgate University *Fall 2015-Spring 2019*
PI: Engda Hagos, PhD

- Investigated and published on the transcription factor KLF4's role in Mitochondrial health and mitophagy
- Initiated and lead a novel project focused on elucidating KLF4's role in metabolic reprogramming
- Supervised and mentored research students in a variety of lab techniques such as western blot, tissue culture, transfection, RT-qPCR, immunofluorescence microscopy, chIP, and confocal microscopy
- Assumed primary leadership of the lab upon PI's sabbatical, responsibilities included: deciding research direction, grant writing, budgeting, ordering, and performing all lab maintenance

Undergraduate Researcher, Lab of Biopolymer Physics, University of Singapore *May 2017-December 2017*
PI: Johan R. C. Van der Maarel, PhD

- Investigated the physics of recombinant megabase-sized chromatin confined to nanochannels
- Performed single molecule fluorescent visualization, nanochannel fabrication, and Atomic force microscopy of biological samples
- Developed polymer physics based models to interpret experimental data
- Extensive use of matlab for video processing and analysis

Lab Assistant, Lab of Experimental Optics, Dept. of Physics, Colgate University *October 2016-May 2017*
PI: Enrique Galvez

- Sought to determine the existence of a proposed discrematory force exerted by photons upon chiral molecules
- Set up and aligned optical pathways, interferometers, and lasers
- Worked on developing a method to visualize fluorescence rotation of chiral carbon nanotubes

High-School Research Assistant, Lab of Molecular Genetics, Dept. of Biology, Long Island University *October 2013-Janaury 2016*
PI: Theodore Brummel, PhD

- Investigated the use of stable isotope mass spectrometry to detect changes in mTOR signaling and autophagy
- Performed drosophila culture, protein extraction, western blotting, lifespan assay, and fly husbandry
- Utilized time-of-flight stable isotope spectrometry to detect nitrogen isotope changes in biological samples
- Maintained fly stocks and co-wrote grants for the lab

HONORS AND AWARDS

- **Student Bioenergeticist Award, Biophysical Society** **Winter 2023**
  Awarded for contributions to the field of mitochondrial biophysics

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- **Jacobs Translational Medicine Fellowship, Caltech** **Spring 2020**
  Awarded to a select group of outstanding, matriculating graduate students who are broadly interested in translational biomedical research.
- **NSF-Graduate Research Fellowship Program Honorable Mention, NSF** **Spring 2020/2021**
  National award for potential in scientific research
- **NIH-Oxford Cambridge Scholar program, NIH (Declined)** **Spring 2020**
  Selected from a national cohort to pursue a collaborative PhD between Oxford/Cambridge (UK) and the NIH
- **Dean's List with Distinction, Colgate University** ***6 semesters***
  Awarded to students with GPA of 3.6+
- **J. Amato and A. Aveni award, Colgate University** ***Spring 2019***
  Awarded to a student that demonstrates undergraduate success and potential in Physics research.
- **Poster Presentation Meritorious Honors, American Association for Cancer Research** ***Spring 2019***
  Awarded to the top 10 undergraduate poster presenters at the AACR annual meeting.
- **Biophysical Society Travel Award, Biophysical Society** ***Winter 2019***
  Awarded travel funding to present first-author research at the Biophysical society annual meeting
- **Post-Baccalaureate Intramural Research Training award, NIH** ***Fall 2018***
  Selected from a competitive pool of applicants to fund 1-2 years of pre-graduate research at the NIH
- **Michael J. Wolk '60 Heart Foundation summer fellowship award, Colgate University** ***Summer 2018***
  Awarded special funding through a competitive application process to support biomedical summer research.
- **Alice Griswold Award, Al Kalfus Long Island Math Fair** ***Spring 2014***
  The highest award given, for the best paper presented at the Long Island Math Fair.

PEER-REVIEWED PUBLICATIONS

1. Rajendran, Megha*, William M. Rosencrans*, Wendy Fitzgerald, Diana Huynh, Bethel G. Beyene, Baiyi Quan, Julie Hwang, Nina Bautista, Tsui-Fen Chou, Sergey M. Bezrukov, and Tatiana K. Rostovtseva, "VDAC isoforms play distinct roles in modulating metabolism and maintaining mitochondrial function" *Biorxiv/ under review JBC *Equal Contribution*
2. Rosencrans, William M., Ryan W. Lee, Logan McGraw, Ian Horsburgh, Ting Yu-Wang, Jennifer Johnston, David C. Chan, and Tsui-Fen Chou, "Putative PINK1/Parkin Activators Lower the Threshold for Mitophagy by Sensitizing Cells to Mitochondrial Stress" *In press, Science Advances*
3. Rosencrans, William M., Maria Queralt-Martin, David P. Hoogerheide, Radhakrishnan Mahalakshmi, Tsui-Fen Chou, Tsyr-Yan Yu, Sergey M. Bezrukov, and Tatiana K. Rostovtseva. "The Dynamic Plasticity of Mitochondrial VDAC2 Regulates its Interaction Kinetics with Cytosolic Proteins." *Sci. Adv.***11**,eadv4410(2025).
4. Rostovtseva, Tatiana K., Michael Weinrich, Daniel Jacobs, William M. Rosencrans, and Sergey M. Bezrukov. "Dimeric Tubulin Modifies Mechanical Properties of Lipid Bilayer, as Probed Using Gramicidin A Channel." *International Journal of Molecular Sciences* 25, no. 4 (2024): 2204.
5. Le Guerroué, François, Eric N. Bunker, William M. Rosencrans, Jack T. Nguyen, Mohammed A. Basar, Achim Werner, Tsui-Fen Chou, Chunxin Wang, and Richard J. Youle. "TNIP1 inhibits selective autophagy via bipartite interaction with LC3/GABARAP and TAX1BP1." *Molecular Cell* 83, no. 6 (2023): 927-941.
6. Rajendran, Megha, María Queralt-Martín, Philip A. Gurnev, William M. Rosencrans, Amandine Rovini, Daniel Jacobs, Kaitlin Abrantes, David P. Hoogerheide, Sergey M. Bezrukov, and Tatiana K. Rostovtseva. "Restricting α-synuclein transport into mitochondria by inhibition of α-synuclein–VDAC complexation as a potential therapeutic target for Parkinson's disease treatment." *Cell. Mol. Life Sci.* **79**, 368 (2022). https://doi.org/10.1007/s00018-022-04389-w
7. Wang, Feng, Shan Li, William M. Rosencrans, Kai-Wen Cheng, Gordon M. Stott, Barbara Mroczkowski, and Tsui-Fen Chou. "Sulforaphane is Synergistic with CB-5083 and Inhibits Colony Formation of CB-5083-Resistant HCT116 Cells." *ChemMedChem* 17, no. 11 (2022): e202200030.
8. Wang, Feng, Shan Li, Kai-Wen Cheng, William M. Rosencrans, and Tsui-Fen Chou. "The p97 Inhibitor UPCDC-30245 Blocks Endo-Lysosomal Degradation." *Pharmaceuticals* 15, no. 2 (2022): 204.
9. Rosencrans, William M., Vicente M. Aguilella, Tatiana K. Rostovtseva, and Sergey M. Bezrukov. "α-Synuclein emerges as a potent regulator of VDAC-facilitated calcium transport." *Cell Calcium* 95 (2021): 102355.
10. Rosencrans, William M., Megha Rajendran, Sergey M. Bezrukov, and Tatiana K. Rostovtseva. "VDAC regulation of mitochondrial calcium flux: From channel biophysics to disease." *Cell Calcium* 94 (2021): 102356.

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11. Basak, Rajib, William Rosencrans, Indresh Yadav, Peiyan Yan, Nikolay V. Berezhnoy, Qinming Chen, Jeroen A. van Kan, Lars Nordenskiöld3, Anatoly Zinchenko, and Johan R. C. Van der Maarel. "Internal motion of chromatin fibers is governed by dynamics of uncompressed linker strands" *Biophysical Journal*, 119 (11)(2020), 2326-2334 https://doi.org/10.1016/j.bpj.2020.10.018
12. Rostovtseva, Tatiana K., María Queralt-Martín, William M. Rosencrans, and Sergey M. Bezrukov. "Targeting the multiple physiologic roles of VDAC with steroids and hydrophobic drugs." *Frontiers in Physiology* 11 (2020).
13. Yadav, Indresh, William Rosencrans, Rajib Basak, Jeroen A. van Kan, and Johan RC van der Maarel. "Intramolecular dynamics of dsDNA confined to a quasi-one-dimensional nanochannel." *Physical Review Research* 2, no. 1 (2020): 013294. https://doi.org/10.1103/PhysRevResearch.2.013294
14. Rosencrans, William M., Zachary H. Walsh, Nadia Houerbi, Andrew Blum, Mezmur Belew, Changchang Liu, Brian Chernak et al. "Cells deficient for Krüppel-like factor 4 exhibit mitochondrial dysfunction and impaired mitophagy." *European Journal of Cell Biology* 99, no. 1 (2020): 151061.
15. Rovini, Amandine, Philip A. Gurnev, Alexandra Beilina, María Queralt-Martín, William Rosencrans, Mark R. Cookson, Sergey M. Bezrukov, and Tatiana K. Rostovtseva. "Molecular mechanism of olesoxime-mediated neuroprotection through targeting α-synuclein interaction with mitochondrial VDAC." *Cellular and Molecular Life Sciences* 77, no. 18 (2020): 3611-3626. https://doi.org/10.1007/s00018-019-03386-w
16. Cheng, Wayland WL, Melissa M. Budelier, Yusuke Sugasawa, Lucie Bergdoll, María Queralt-Martín, William Rosencrans, Tatiana K. Rostovtseva et al. "Multiple neurosteroid and cholesterol binding sites in voltage-dependent anion channel-1 determined by photo-affinity labeling." *Biochimica et Biophysica Acta (BBA)-Molecular and Cell Biology of Lipids* 1864, no. 10 (2019): 1269-1279.
17. Brauer, Philip R., Jee Hun Kim, Humberto J. Ochoa, Elizabeth R. Stratton, Kathryn M. Black, William Rosencrans, Eliza Stacey, and Engda G. Hagos. "Krüppel-like factor 4 mediates cellular migration and invasion by altering RhoA activity." *Cell communication & adhesion* 24, no. 1 (2018): 1-10.
18. Zinchenko, Anatoly, Nikolay V. Berezhnoy, Sai Wang, William M. Rosencrans, Nikolay Korolev, Johan R. C. van der Maarel, and Lars Nordenskiöld. "Single-molecule compaction of megabase-long chromatin molecules by multivalent cations." *Nucleic acids research* 46, no. 2 (2018): 635-649.

TEACHING

Teaching Assistant (TA), BBE, Caltech *Spring 2021, Winter 2024-2025*

- Served as a teaching assistant for introductory biology and cellular microscopy
- Wrote all assignment/test questions for class
- Developed lab based assignments to teach modern microscopy techniques

Tutor, Center for Learning, Teaching, and Research (CLTR), Colgate University *Spring 2019*

- Served as a personal tutor for students struggling in molecular biology classes
- Worked with students to develop smart studying habits and test taking skills

Lab Teacher Assistant (TA), Dept. of Biology, Colgate University *Spring 2017*

- Gave lectures on cell biology and laboratory practice
- Aided professor in mediating student operation of lab apparatus as well answering questions pertaining to cell biology concepts and techniques

CONFERENCE PRESENTATIONS (As presenting author)

- ***The FIP200 CLAW domain functions as an Anionic Membrane Tether***
  2025 Biophysical society conference, Flash talk and poster
- ***The Mitochondrial VDAC Isoforms: One molecule at a time***
  2023 Biophysical society conference, Bioenergetics award talk
- ***A Dynamic Plasticity of VDAC2 revealed by Single-Molecule Electrophysiology***
  2020 Biophysical society conference, San Diego CA
- ***VDAC Isoforms in Mitochondrial Biology: Why so Similar, yet Different?***
  2019 NHLBI Mitochondrial Biology Symposium, National Institutes of Health, Bethesda MD
- ***KLF4 regulates metabolic homeostasis in response to energy stress***
  2019 AACR Annual Meeting, Atlanta Georgia

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- ***Effect of steroids on Mitochondrial Metabolite Channel Function and Lipid Membrane Properties***
  2019 Biophysical society conference, Baltimore MD
- ***A screen for the effect of nonpolar compounds on VDAC function, identifies olesoxime as an allosteric modifier of VDAC gating function***
  2019 Physics honors theses Symposium, Colgate University, Hamilton NY
- ***Effect of steroids on Mitochondrial Metabolite Channel Function and Lipid Membrane Properties***
  2018 NIH Research Festival, National Institutes of Health, Bethesda MD
- ***Stretch and dynamics of single chromatin molecules confined to nanofluidic channels***
  2018 Biophysical Society Conference, San Francisco CA
- ***Cells deficient for Kruppel-Like Factor 4 exhibit impaired mitophagy***
  2017 National Conference on Undergraduate Research, Memphis TN
- ***The effect of TOR signaling on nitrogen stable isotope fractionation***
  2016 Society for Integrative and Comparative Biology annual meeting, Portland OR
- ***An exploration of the regions created by cevians in triangles***
  2014 Al Kalfus Long Island Math Fair, Hempstead NY

Grants and Funding

- Pharmacological targeting of Tau aggregates for autophagic removal, $ 2,810,983. October *2022-October 2025*
- Development of MitoTAC compounds to treat Parkinson's disease March *2023-March 2025*
  The Merkin Institute for Translational Research, $400,000
- Uncovering the biochemical and structural basis of the VDAC-p97 interaction 2022
  The J. Yang and Family Foundation, $40,000

MEMBERSHIP/PROFESSIONAL SOCIETIES

- American Physical Society *2019-2020*
- Society of Physics Students *2019-2020*
- American Association of Cancer Research, student membership *2018-2020*
- Sigma Pi Sigma Physics Honor society *2018-2020*
- Biophysical Society *2017-present*
- Society for Integrative and Comparative Biology *2015-2016*

REFERENCES

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