

DIEGO KRAPF

Electrical and Computer Engineering
Colorado State University
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Fort Collins, CO 80523

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<http://www.engr.colostate.edu/~krapf/biophysics>

RESEARCH INTERESTS

Single-molecule biophysics. Anomalous diffusion. Cellular architecture. Membrane dynamics. Superresolution imaging. Intracellular trafficking. Cytoskeleton-membrane interactions. Stochastic processes. Mammalian sperm capacitation. $1/f$ noise.

EDUCATION

Ph.D., Applied Physics, 2004

SCHOOL OF APPLIED SCIENCE, HEBREW UNIVERSITY OF JERUSALEM – ISRAEL

M.Sc., Applied Physics, 2000

SCHOOL OF APPLIED SCIENCE, HEBREW UNIVERSITY OF JERUSALEM – ISRAEL

B.Sc., Physics, 1997

RACAH INSTITUTE OF PHYSICS, HEBREW UNIVERSITY OF JERUSALEM – ISRAEL

RESEARCH EXPERIENCE

Professor

COLORADO STATE UNIVERSITY, ELECTRICAL AND COMPUTER ENGINEERING 2020 to present

COLORADO STATE UNIVERSITY, SCHOOL OF BIOMEDICAL ENGINEERING 2020 to present

COLORADO STATE UNIVERSITY, SCHOOL OF ADVANCED MATERIALS DISCOVERY 2020 to present

Associate Professor

COLORADO STATE UNIVERSITY, ELECTRICAL AND COMPUTER ENGINEERING 2013 to 2020

COLORADO STATE UNIVERSITY, SCHOOL OF BIOMEDICAL ENGINEERING 2013 to 2020

Visiting Scientist

INSTITUTE OF MOLECULAR AND CELLULAR BIOLOGY OF ROSARIO (IBR) AND INSTITUTE OF BIOLOGY AND EXPERIMENTAL MEDICINE (IBYME) 2019

CONICET – ARGENTINA

WROCLAW UNIVERSITY OF TECHNOLOGY, HUGO STEINHAUS CENTER 2016

FACULTY OF PURE AND APPLIED MATHEMATICS – POLAND

DIEGO KRAPF

Assistant Professor

COLORADO STATE UNIVERSITY, ELECTRICAL AND COMPUTER ENGINEERING 2007 to 2013
COLORADO STATE UNIVERSITY, SCHOOL OF BIOMEDICAL ENGINEERING 2007 to 2013

Postdoctoral researcher (Cees Dekker's group)

DELFT UNIVERSITY OF TECHNOLOGY, 2004 to 2007
KAVLI INST. OF NANOSCIENCE – NETHERLANDS

MS and PhD (Amir Sa'ar's group)

HEBREW UNIVERSITY OF JERUSALEM, SCHOOL OF APPLIED SCIENCE – ISRAEL 1998 to 2003

TEACHING EXPERIENCE

COURSES DEVELOPED

COLORADO STATE UNIVERSITY

MSE 506, **Electronic properties of materials: Quantum mechanics** 2018
ECE/MATH 522, **Random Walks** 2016
BIOM 570, **Bioengineering. Biophotonics module** 2011
ECE/BIOM 680A1, **Methods in Nanoscale Biophysics** 2010
ECE/BIOM 526, **Biological Physics** 2008

COURSES TAUGHT

COLORADO STATE UNIVERSITY

ECE/MATH 522, **Random Walks** 2016 - 2020
ECE/BIOM 526, **Biological Physics** 2008 - 2020
ECE/STAT 303, **Introduction to Communications Principles** 2012 - 2020
MSE 506A, **Electronic Properties of Materials: Quantum Mechanics** 2018 - 2020
MSE 506B, **Electronic Properties of Materials: Band Structure** 2020
BIOM/ECE 527A, **Biosensing: Cells as Circuits** 2019
ECE 471A, **Semiconductor Physics** 2011 - 2016
ECE 471B, **Semiconductor Junctions** 2016
ECE 572, **Semiconductor Transistors** 2011 - 2016
BIOM/ECE 533, **Biomolecular Tools for Engineers** 2008 - 2014
BIOM570, **Bioengineering: Biophotonics** 2011 - 2013
ECE/BIOM 680A1, **Methods in Nanoscale Biophysics** 2010

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COLORADO STATE UNIVERSITY - ONLINE

ECE/MATH 522, Random Walks	2016 - 2020
ECE/STAT 303, Introduction to Communications Principles	2018 - 2020
ECE/BIOM 526, Biological Physics	2015 - 2020

GUEST LECTURES

COLORADO STATE UNIVERSITY

ECE 341, Electromagnetic Fields I	2007, 2011
ECE 342, Electromagnetic Fields & Devices II	2008
BIOM 470, Biomedical Engineering	2008 - 2012
BIOM 570, Bioengineering	2008 - 2010
ECE 505, Nanostructures Fundamentals and Applications	2009

DELFT UNIVERSITY OF TECHNOLOGY – DELFT, THE NETHERLANDS

Introduction to Biophysics	2006
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TEACHING ASSISTANT

JERUSALEM COLLEGE OF ENGINEERING – JERUSALEM, ISRAEL

Physics of Semiconductors	2001 - 2003
Semiconductor Devices	2001 - 2003

RACAH INSTITUTE OF PHYSICS, HEBREW UNIVERSITY OF JERUSALEM – JERUSALEM, ISRAEL

Advanced Physics Laboratory	2000 - 2003
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AWARDS

Dr. Bernardo Houssay Award of the Argentine Society of Biology (Sociedad Argentina de Biología), Argentina (2020)

César Milstein Award by the Ministry of Science, Technology and Productive Innovation, Argentina (2019)

George T. Abell Outstanding Mid-Career Faculty Award, Colorado State University (2018)

Interdisciplinary Scholarship Award from the Office of the Vice President for Research at Colorado State University (2018)

Best poster award at APS 4 Corners Meeting (2017)

Best ECE Senior Design Project, Colorado State University (2015)

IEEE High Plains Best Paper Award (2014)

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Best poster award at APS 4 Corners Meeting (2009)

Best poster at Colorado Photonics Industry Association Annual Meeting (2009)

Rector Scholarship, Hebrew University of Jerusalem, Israel (2000)

Levy Eshkol Award, Israeli Ministry of Science and Technology, Israel (1999-2003)

STUDENT AND POSTDOCTORAL ADVISING

POSTDOCTORAL SCHOLARS

Grzegorz Sikora (2017)

PH.D. THESIS STUDENTS CURRENTLY BEING SUPERVISED

Carsten Dietvorst, *PhD Electrical Engineering*

PH.D. SUPERVISION COMPLETED

Xinran Xu, *PhD Electrical Engineering*, 2019

Bryce Schroder, *PhD Biomedical Engineering*, 2018

Sanaz Sadegh, *PhD Electrical Engineering*, 2017

Aubrey Weigel, *PhD Biomedical Engineering*, 2013

M.S. SUPERVISION COMPLETED

Terrance Bishop, *MS student*, 2020

Kanti Nepal, *MS Biomedical Engineering*, 2017

Jenny Higgins, *MS Electrical Engineering*, 2013

Robert Merrill, *MS Physics*, 2008

UNDERGRADUATE STUDENTS SUPERVISED

SUPERVISED 25 UNDERGRADUATE STUDENTS SINCE 2009

Terrance Bishop (2016-2017), Nicole Boticke (2015), Jarvis Hill (2009), Kari Ecklund (2011), Peter Hammes (2016), Hilary Haws (2013), James Jaramillo (2015), Jeffrey Kostecki (2015), Adam LeJeune (2017), Patrick Mannion (2015-2017), Anthony Nicholson (2013), Kassi Prochazka (2014-2015), Nathan Proper (2009-2010), Mike Reid (2011-2012), Tim Seek (2015), PJ Seel (2013-2015), Tyler Simonsen (2013), Ashley Stewart (2009), Jeremy Stone (2009-2010), Krystal Tamayo (2016), Robert Turner (2015-2017), Bryce Wilson (2016), James Winter (2012), Ty Wojcik (2009-2011), Xinran Xu (2013)

GRADUATE STUDENT LAB ROTATIONS (10 WEEK PROJECTS)

Barb Smith (2009), Bryce Schroder (2011), Dominic Asebiah (2019)

GRADUATE STUDENT COMMITTEE

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PHD COMMITTEE MEMBER OF 33 STUDENTS

Farshad Abdollah-Nia (Physics), Liz Akin (Biomedical Sciences), Lee Allen (ECE), Jutta Bikowski (Mathematics), Wei-Ting Chen (Physics), Myeong Yeol Choi (ECE), Victoria Combs (Chemistry), Scott Compel (Chemistry), Alden Curtis (ECE), Scott Domingue (ECE), Megan Dunlap (Chemistry), Kristen Farrell (Biochemistry), Zachary Fox (SBME), John Gann (Chemistry), Hasan Hedayati (CBE), Ilya Kuznetsov (ECE), Andrew Lamb (Biochemistry), Wei Li (ECE), Erik Malm (ECE), Joshua Mannheimer (SBME), Emily Maverick (Biomedical Sciences), Michael May (SBME), Michelle Mellenthin (SBME), Reagan Pennock (Biomedical Sciences), Shankarchary Ragi (ECE), Will Raymond (SBME), Matthew Saxton (Biochemistry), Dave Smith (SBME), Melissa Swager (Math), Erkang Wang (ECE), Weina Wang (ECE), Jesse Wilson (ECE), Ling Zhang (Biochemistry), and Morteza Ziaee (CBE)

MS COMMITTEE MEMBER OF 8 STUDENTS

Sergio Carbajo (ECE), Alden Curtis (ECE), Nicole Forseth (Chemistry), Ben Jenkins (ECE), Manasi S. Katragadda (ECE), Carter Lyons (Math), Katherine Schaumberg (SBME), and Maximiliano Vallejos (Biochemistry)

EXTERNAL PHD COMMITTEE MEMBER

Joshua Mabry (CU-Boulder, USA), Sayed Mohsen Jebreil Khadem (Humboldt-Universität zu Berlin, Germany), Gorka Muñoz (ICFO, Spain)

CURRICULAR PRACTICAL TRAINING (CPT)

Nilesh More (2016)

VISITING SCIENTISTS HOSTED

Takuma Akimoto (*Visiting Researcher, 2020*), Tokyo University of Science, Japan

Erez Aghion (*Visiting Researcher, 2020*) Max-Planck Institute for Complex Systems, Dresden, Germany

Mariano G. Buffone, (*Fullbright Visiting Scholar, 2016-2017*). Instituto de Biología y Medicina Experimental (IBYME), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina

Krzysztof Burnecki (*Visiting Researcher, 2017*) Wrocław University of Science and Technology, Poland

María Gracia Gervasi (*Visiting Researcher, 2015, 2017*), University of Massachusetts – Amherst

Darío Krapf (*Visiting Researcher, 2017*) Universidad Nacional de Rosario, Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Rosario, Argentina

Guillermina Luque (*Visiting Researcher, 2018*) Instituto de Biología y Medicina Experimental (IBYME), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina

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Adal Sabri (*Visiting Graduate Student, 2017, 2018*), University of Bayreuth, Germany

Agnieszka Wyłomańska (*Visiting Researcher, 2017*) Wrocław University of Science and Technology, Poland

PROFESSIONAL AFFILIATIONS

American Physical Society (APS, member)

Biophysical Society (member)

Institute of Electronic and Electrical Engineers (IEEE, senior member)

Optical Society of America (OSA, member)

UNIVERSITY SERVICE ACTIVITIES

Member of the WSCOE Faculty Awards committee	2019
Member of ECE Head's Advisory Committee	2018 - 2021
Member of ECE Curriculum Committee	Since 2016
Member of the SBME Graduate Curriculum Committee	Since 2013
Member of the ECE Graduate Committee	Since 2008
Member of the ECE Faculty Search Committee	2012 - 2013
Member of SBME Undergraduate Curriculum Committee	2010 - 2016
Chair of the SBME Graduate Curriculum Committee	2010 - 2012
Member of the ECE Curriculum Committee	2009 - 2010

PROFESSIONAL ACTIVITIES

EDITOR ACTIVITIES

Editorial Board Member, Entropy	Since 2020
Editorial Board Member, Scientific Reports	Since 2016
Member of the Publications Committee of the Biophysical Society	2018 - 2021
Guest editor, IEEE Journal of Selected Topics in Quantum Electronics	2015
Editorial Board Member, IEEE Access	2012 - 2013

CHAIR AND CONFERENCE ORGANIZATION

Organizer, Colorado Single Molecule in Membranes Meeting	2020
Symposium Chair, 2017 Biophysical Society Meeting (Anomalous Dynamics in Biological Systems)	2017

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Session Chair, 2014 Biophysical Society Meeting (Endocytosis and Exocytosis)	2014
Session Chair, Physics of the Earth and Life/Bio-Physics Research Colloquium, "Physics at Colorado State University: Neutrinos to Nano Science"	2012
Organizer, Second Colorado Single Molecule in Membranes Meeting	2012
Organizer, CSU Biophysical Journal Club	2010 - 2014

PROPOSAL REVIEWER ACTIVITIES

National Science Foundation,
Physics of Living Systems
SBIR/STTR phase I, Lasers
SBIR/STTR phase II, Biosensors/Diagnostic Devices
SBIR phase I, Analytical Methods & Devices
Biomolecular System Cluster

Agencia Nacional de Promoción Científica y Tecnológica, Argentina
Comisión de Ciencias Biológicas de Células y Moléculas

Natural Sciences and Engineering Research Council of Canada
(NSERC), Canada
Genes, Cells and Molecules Evaluation Group

LE STUDIUM Loire Valley Institute for Advanced Studies, France
Research Consortia

AD-HOC JOURNAL REVIEWER

ACS Nano, Applied Optics, Biomedical Optics Express, Biophysical Journal, BMC Biology, Electrophoresis, IEEE Photonics Journal, JACS, Journal of Chemical Physics, Journal of Physics A, Langmuir, Molecular Biology of the Cell, Nature Communications, Nature Nanotechnology, Optics Express, Optics Letters, Physica A, Physical Review E, Physical Review Letters, Physical Review X, PNAS, Reports on Progress in Physics, Reproduction, Review of Scientific Instruments, Science Advances

PROFESSIONAL SERVICE

Member of STEM Advisory Board, Colorado Early Colleges, Ft. Collins	Since 2019
Member Gifted and Talented Advisory Board, Poudre School District	2015 - 2018
Chair of IEEE Denver Photonics Chapter	2009 - 2012
Secretary of IEEE Denver Photonics Chapter	2013 - 2017

LANGUAGES

English, Hebrew, Italian, and Spanish (written and spoken)

PUBLICATIONS

3,500+ citations, h-index: 28

<https://scholar.google.com/citations?user=eN1cxI0AAAAJ>

PEER-REVIEWED JOURNAL ARTICLES

1. S. Thapa, A. Wylomanska, G. Sikora, C.E. Wagner, **D. Krapf**, H. Kantz, A. Chechkin, R. Metzler, “Leveraging large-deviation statistics to decipher the stochastic properties of measured trajectories”, *New Journal of Physics* (in press)
2. A. Sabri, X. Xu, **D. Krapf**, and M. Weiss, “Elucidating the origin of heterogeneous anomalous diffusion in the cytoplasm of mammalian cells”, *Physical Review Letters* **125**, 058101 (2020)
3. M.E. Teves, E.R.S. Roldan, **D. Krapf**, J.F. Strauss III, V. Bhagat, and P. Sapao, “Sperm Differentiation: The Role of Trafficking of Proteins”, *International Journal of Molecular Sciences* **21**, 3702 (2020)
4. M. Hedayati, M.J. Kipper, and **D. Krapf**, “Anomalous protein kinetics on low-fouling surfaces”, *Physical Chemistry Chemical Physics* **22**, 5264 (2020)
5. M. Hedayati, D.F. Marruecos, **D. Krapf**, J.L. Kaar, and M.J. Kipper, “Protein adsorption measurements on low fouling and ultralow fouling surfaces: A critical comparison of surface characterization techniques”, *Acta Biomaterialia* **102**, 169 (2020)
6. **D. Krapf** and R. Metzler, “Strange interfacial molecular dynamics”, *Physics Today* **72** (9), 48 – 54 (2019)
7. **D. Krapf**, N. Lukat, E. Marinari, R. Metzler, G. Oshanin, C. Selhuber-Unkel, A. Squarcini, L. Stadler, M. Weiss, and X. Xu, “Spectral content of a single non-Brownian trajectory”, *Physical Review X* **9**, 011019 (2019)
8. K. Burnecki, G. Sikora, A. Weron, M.M. Tamkun, and **D. Krapf**, “Identifying diffusive motions in single-particle trajectories on the plasma membrane via fractional time series models”, *Physical Review E* **99**, 012101 (2019)
9. M.J. Metz, R.L. Pennock, **D. Krapf**, and S.T. Hentges, “Temporal dependence of shifts in mu opioid receptor mobility at the cell surface after agonist binding observed by single-particle tracking”, *Scientific Reports* **9**, 7297 (2019)
10. A. Romarowski, A. Velasco Felix, P. Torres Gimenez, M.G. Gervasi, X. Xu, G.M. Luque, G. Contreras Gimenez, C. Sanchez Cardenas, H.V. Ramirez Gomez, **D. Krapf**,

- P.E. Visconti, D. Krapf, A.O. Guerrero, A. Darszon, and M.G. Buffone, "Super-resolution imaging of live sperm reveals dynamic changes of the actin cytoskeleton during acrosomal exocytosis", *Journal of Cell Science* **131**, jcs218958 (2018)
11. M. Hedayati, M.M. Reynolds, **D. Krapf**, and M.J. Kipper, "Nanostructured surfaces that mimic the vascular endothelial glycocalyx reduce blood protein adsorption and prevent fibrin network formation", *ACS Applied Materials & Interfaces* **10**, 31892 – 31902 (2018)
 12. D.S. Grebenkov and **D. Krapf**, "Steady-state reaction rate of diffusion-controlled reactions in sheets", *Journal of Chemical Physics* **149**, 064117 (2018)
 13. G. Sikora, A. Wylomańska, and **D. Krapf**, "Recurrence statistics for anomalous diffusion regime change detection", *Computational Statistics and Data Analysis* **128**, 380 – 394 (2018)
 14. M.G. Gervasi, X. Xu, B.I. Carbajal-González, M.G. Buffone, P.E. Visconti, and **D. Krapf**, "The actin cytoskeleton of the mouse sperm flagellum is organized in a helical structure", *Journal of Cell Science* **131**, jcs215897 (2018)
 15. C. Stival, C. Ritagliati, X. Xu, M.G. Gervasi, G.M. Luque, C. Baro Graf, J.L. Vega-Beltran, N.I. Torres, A. Darszon, **D. Krapf**, M.G. Buffone, P.E. Visconti, and D. Krapf, "Disruption of protein kinase A localization induces acrosomal exocytosis in capacitated mouse sperm", *Journal of Biological Chemistry* **293**, 9435 – 9447 (2018)
 16. **D. Krapf**, "Compartmentalization of the plasma membrane", *Current Opinion in Cell Biology* **53**, 15 – 21 (2018)
 17. **D. Krapf**, E. Marinari, R. Metzler, G. Oshanin, X. Xu, and A. Squarcini, "Power spectral density of a single Brownian trajectory: What one can and cannot learn from it", *New Journal of Physics* **20**, 023029 (2018)
 18. G. Sikora, A. Wylomańska, J. Gajda, L. Solé, E.J. Akin, M. M. Tamkun, and **D. Krapf**, "Elucidating distinct ion channel populations on the surface of hippocampal neurons via single-particle tracking recurrence analysis", *Physical Review E* **96**, 062404 (2017)
 19. A. Weron, K. Burnecki, E.J. Akin, L. Solé, M. Balcerek, M.M. Tamkun, and **D. Krapf**, "Ergodicity breaking on the neuronal surface emerges from random switching between diffusive states", *Scientific Reports* **7**, 5404 (2017)
 20. S. Sadegh, J.L. Higgins, P.C. Mannion, M.M. Tamkun, and **D. Krapf**, "Plasma membrane is compartmentalized by a self-similar cortical actin meshwork", *Physical Review X* **7**, 011031 (2017)
 21. O. Wiggan, B.W. Schroder, **D. Krapf**, J.R. Bamburg, and J.G. DeLuca, "Cofilin regulates nuclear architecture through a myosin-II dependent mechanotransduction module", *Scientific Reports* **7**, 40953 (2017)

22. E.J. Akin, L. Solé, B. Johnson, M. el Beheiry, J-B. Masson, **D. Krapf**, and M.M. Tamkun, "Single-molecule imaging of Na_v1.6 on the somatic surface of hippocampal neurons reveals unique nanoclusters", *Biophysical Journal* **111**, 1235 – 1247 (2016)
23. A. Alvau,, M.A. Battistone, M.G. Gervasi, A.M. Salicioni, F.A. Navarrete, X. Xu, C. Sanchez, J.L. De la Vega-Beltran, V. Da Ros, P. Greer, A. Darszon, **D. Krapf**, P. Cuasnicu, and P.E. Visconti, "The tyrosine kinase FER is responsible for the capacitation-associated increase in tyrosine phosphorylation in murine sperm", *Development* **143**, 2325 – 2333 (2016)
24. **D. Krapf**, G. Campagnola, K. Nepal, and O.B. Peersen, "Strange kinetics of bulk-mediated diffusion on lipid bilayers", "Strange kinetics of bulk-mediated diffusion on lipid bilayers", *Physical Chemistry Chemical Physics* **18**, 12633 – 12641 (2016)
25. G. Campagnola, K. Nepal, B.W. Schroder, O.B. Peersen, and **D. Krapf**, "Superdiffusive motion of membrane-targeting C2 domains", *Scientific Reports* **5**, 17721 (2015)
26. P.D. Fox, C.J. Haberkorn, E.J. Akin, P.J. Seel, **D. Krapf**, and M.M. Tamkun, "Induction of stable endoplasmic reticulum/plasma membrane junctions by Kv2.1 potassium channels", *Journal of Cell Science* **128**, 2096 – 2105 (2015)
27. **D. Krapf**, "Mechanisms underlying anomalous diffusion in the plasma membrane", *Current Topics in Membranes* vol. **75** (Lipid Domains), 167 – 207 (2015)
28. **D. Krapf**, "Dynamic fluctuations in single-molecule biophysics experiments - Comment on Extracting physics of life at the molecular level: A review of single-molecule data analyses", *Physics of Life Reviews* **13**, 148 (2015)
29. S. Sadegh, E. Barkai, and **D. Krapf**, "1/f noise for intermittent quantum dots exhibits non-stationarity and critical exponents" *New Journal of Physics* **16**, 113054 (2014)
30. A.V. Weigel, M.M. Tamkun, and **D. Krapf**, "Quantifying the dynamic interactions between a clathrin-coated pit and cargo molecules" *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* **110**, E4591 – E4600 (2013)
31. P.D. Fox, C.J. Haberkorn, A.V. Weigel, J.L. Higgins, E.J. Akin, M.J. Kennedy, **D. Krapf**, and M.M. Tamkun, "Plasma membrane domains enriched in cortical endoplasmic reticulum function as membrane protein trafficking hubs", *Molecular Biology of the Cell* **24**, 2703 – 2713 (2013)
[Selected for highlights of Molecular Biology of the Cell by the journal editorial board.](#)
32. **D. Krapf**, "Nonergodicity in nanoscale electrodes", *Physical Chemistry Chemical Physics* **15**, 459 – 465 (2013)
33. A.V. Weigel, P.D. Fox, E.J. Akin, K.H. Ecklund, M.M. Tamkun, and **D. Krapf**, "Size of cell-surface Kv2.1 domains is governed by growth fluctuations", *Biophysical Journal* **103**, 1727 – 1734 (2012)

34. E. Deutsch, A.V. Weigel, E. Akin, P. Fox, G. Hansen, R. Loftus, **D. Krapf**, and M.M. Tamkun, “Kv2.1 cell surface clusters are insertion platforms for ion channel delivery to the plasma membrane”, *Molecular Biology of the Cell* **23**, 2917 – 2929 (2012)
[Selected for highlights of Molecular Biology of the Cell by the journal editorial board.](#)
35. A.V. Weigel, S. Ragi, M.L. Reid, E.K.P. Chong, M.M. Tamkun, and **D. Krapf**, “Obstructed diffusion propagator analysis for single particle tracking”, *Physical Review E* **85**, 041924 (2012)
36. T. Wojcik and **D. Krapf**, “Automatic nanopore recognition and measurement using Shannon entropy”, *IEEE Photonics Journal* **3**, 337 – 343 (2011)
37. A.V. Weigel, B. Simon, M.M. Tamkun, and **D. Krapf**, “Ergodic and nonergodic processes coexist in the plasma membrane as observed by single molecule tracking”, *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* **108**, 6438 – 6443 (2011) [500 citations](#)
38. M.Y. Wu, R.M.M. Smeets, M. Zandbergen, **D. Krapf**, P.E. Batson, N.H. Dekker, C. Dekker, and H.W. Zandbergen, “Control of shape and material composition of solid-state nanopores”, *Nano Letters* **9**, 479 – 484 (2009) [100 citations](#)
39. M.A.G. Zevenbergen, **D. Krapf**, M.R. Zuiddam, and S.G. Lemay, “Mesoscopic concentration fluctuations in a fluidic nanocavity detected by redox cycling”, *Nano Letters* **7**, 384 – 388 (2007) [Cover of Nano Letters Volume 7, Issue 2 \(February 2007\)](#)
40. **D. Krapf**, B.M. Quinn, M.Y. Wu, H. Zandbergen, C. Dekker, and S.G. Lemay, “Experimental observation of nonlinear ionic transport at the nanometer scale”, *Nano Letters* **6**, 2531 – 2535 (2006)
41. U.F. Keyser, B.N. Koeleman, S. van Dorp, **D. Krapf**, R.M.M. Smeets, S.G. Lemay, N.H. Dekker, and C. Dekker, “Direct force measurements on DNA in a solid-state nanopore”, *Nature Physics* **2**, 473 – 477 (2006) [600 citations](#)
42. **D. Krapf**, M.Y. Wu, R.M.M. Smeets, H. Zandbergen, C. Dekker, and S.G. Lemay, “Fabrication and characterization of nanopore-based electrodes with radii down to 2 nm”, *Nano Letters* **6**, 105 – 109 (2006) [100 citations](#)
43. R.M.M. Smeets, U.F. Keyser, **D. Krapf**, M.Y. Wu, N.H. Dekker and C. Dekker, “Salt-dependence of ion transport and DNA translocation through solid-state nanopores”, *Nano Letters* **6**, 89 – 95 (2006) [700 citations](#)
44. U.F. Keyser, **D. Krapf**, B.N. Koeleman, R.M.M. Smeets, N.H. Dekker, and C. Dekker, “Nanopore tomography of a laser focus”, *Nano Letters* **5**, 2253 – 2256 (2005)
45. A. Sa'ar, Y. Reichman, M. Dovrat, **D. Krapf**, J. Jedrzejewski, and I. Balberg, “Resonant coupling between surface vibrations and electronic states in silicon nanocrystals at the strong confinement regime”, *Nano Letters* **5**, 2443 – 2447 (2005) [100 citations](#)

46. M.Y. Wu, **D. Krapf**, M. Zandbergen, H. Zandbergen, and P.E. Batson, "Formation of nanopores in a SiN/SiO₂ membrane with an electron beam", *Applied Physics Letters* **87**, 113106 (2005) [100 citations](#)
47. S.G. Lemay, D.M. van den Broek, A.J. Storm, **D. Krapf**, R.M.M. Smeets, H.A. Heering, and C. Dekker, "Lithographically fabricated nanopore-based electrodes for electrochemistry", *Analytical Chemistry* **77**, 1911 – 1915 (2005)
48. **D. Krapf**, S.-H. Kan, U. Banin, O. Millo, and A. Sa'ar, "Intersublevel optical transitions in InAs nanocrystals probed by photoinduced absorption spectroscopy: The Role of Thermal Activation", *Physical Review B* **69**, 073301 (2004)
49. **D. Krapf**, A. Davidi, J. Shappir, and A. Sa'ar, "Infrared photo-induced absorption spectroscopy of porous silicon", *Physica Status Solidi A* **197**, 566 – 571 (2003)
50. **D. Krapf**, B. Adoram, K. L. Wang, J. Shappir and A. Sa'ar, "Infrared multispectral detection using Si/Si_xGe_{1-x} quantum well infrared photodetectors", *Applied Physics Letters* **78**, 495 – 497 (2001)
51. B. Adoram, **D. Krapf**, M. Levy, R. Besserman, K. L. Wang, J. Shappir, and A. Sa'ar, "Thermal relaxation processes in Si_{1-x}Ge_x/Si quantum wells studied by intersubband and inter-valence band optical spectroscopy", *Physica E* **7**, 255 – 258 (2000)
52. B. Adoram, **D. Krapf**, M. Levy, R. Besserman, S. Thomas, K. L. Wang, J. Shappir, and A. Sa'ar, "Thermal relaxation processes probed by intersubband and intervalence-band transitions in Si/Si_{1-x}Ge_x multiple quantum wells", *Applied Physics Letters* **75**, 2232 – 2234 (1999)

PEER-REVIEWED CONFERENCE PROCEEDINGS

1. "Force spectroscopy in the bloodstream of live embryonic zebrafish with optical tweezers" B.W. Schroder, B.M. Johnson, D.M. Garrity, L.P. Dasi, and **D. Krapf**, *2014 Frontiers in Optics* (Optical Society of America, Tucson AZ, 2014), FTu1F
2. "Kv2.1 anomalous diffusion observed by single molecule tracking" A.V. Weigel, M.M. Tamkun, and **D. Krapf**, *IEEE Engineering in Medicine and Biology Society Conference Proceedings*, 3005 – 3008 (2010)
3. "A field friendly laser-based biosensor platform for the detection of tuberculosis Antigens", **D. Krapf**, M.S. Scherman, B.S. Smith, K.L. Jevsevar, N. Proper, J. Stone, J.S. Spencer, and M.R. McNeil, *2010 Biomedical Optics* (Optical Society of America, Washington DC, 2010)
4. "Tracking single potassium channels in live mammalian cells", A.V. Weigel, and M.M. Tamkun, **D. Krapf**, *Laser Science XXV* (Optical Society of America, Washington DC, 2009), LSWD3

5. “Fluorescence immunoassay for the detection of latent tuberculosis antigens with single molecule sensitivity”, B.S. Smith, M.S. Scherman, A.V. Weigel, K.L. Jevsevar, J. Hill, J. Spencer, M.R. McNeil, and **D. Krapf**, *2009 Frontiers in Optics* (Optical Society of America, Washington DC, 2009), JWC68
Paper selected as OSA Spotlight (2 papers selected out of more than 1000 presentations).
6. “Giant amplification of redox current in a nanofluidic channel”, M.A.G. Zevenbergen, **D. Krapf**, M.R. Zuiddam, and S.G. Lemay, *Proceedings of the 10th Micro Total Analysis Systems Conference*, 654 – 656 (2006) Tokyo, Japan

NON-PEER-REVIEWED ARTICLES

1. S. Thapa, A. Wyłomańska, G. Sikora, C.E. Wagner, **D. Krapf**, H. Kantz, A.V. Chechkin, and R. Metzler, “Leveraging large-deviation statistics to decipher the stochastic properties of measured trajectories”, *arXiv:2005.02099* (2020)
2. A.L. Oldenburg, Y. Chen, **D. Krapf**, A. Mahadevan-Jansen, J. Rolland, and J. Tunnell, “Introduction to the issue on biophotonics”, *IEEE Journal of Selected Topics in Quantum Electronics* **22** (3), 1 – 3 (2016)
3. A. Mont, A.V. Weigel, **D. Krapf**, and C.P. Calderon, “Uncertainty quantification of discrete association problems in image sequence-based tracking”, *arXiv:1304.5759* [q-bio.QM] (2013)

PRESENTATIONS

INVITED CONFERENCE LECTURES

1. “Spatiotemporal dynamics of membrane receptors at the nanoscale”
Biophysical Society Meeting, San Diego, CA, February 2020
2. “Anomalous protein kinetics on low-fouling surfaces”
Colorado Single Molecule in Membranes Meeting
Denver, CO, January 2020
3. “Heterogeneous anomalous diffusion in the cytoplasm of mammalian cells”
Stochastic and AI Modeling of Complex Systems
Wrocław, Poland, December 2019
4. “Anomalous kinetics on low-fouling surfaces”
2nd Bad Wildbad Meeting on Random Processes & Applications
Bad Wildbad, Germany, September 2019

5. "Spatiotemporal dynamics of membrane receptors at the nanoscale"
Inserm 250 - Intracellular dynamics of molecules: analysis and models
Bordeaux, France, June 2019
6. " $1/f^\beta$ power spectral densities of individual trajectories"
Venice Meeting on Fluctuations in Small Complex Systems IV
Venice, Italy, October 2018
7. "First passage times, ergodicity and ageing for single-particle tracking in biological membranes"
MiFoBio - Functional Microscopy for Biology, Seignosse, France, October 2018
8. "Bulk-mediated diffusion on lipid bilayers"
5th Colorado Single Molecules in Membranes Meeting (CSMMM)
Denver CO, January 2018
9. "First passage times, ergodicity and ageing for single-particle tracking in biological membranes"
Summer School on Stochastic Processes with Applications to Physics and Biophysics, Acre, Israel, September 2017
10. "Nonergodic dynamics in the plasma membrane"
30th Marian Smoluchowski Symposium on Statistical Physics
Kraków, Poland, September 2017
11. "Dynamic organization of the plasma membrane in mammalian cells"
q-bio Summer School, Colorado State University, Fort Collins, CO, June 2017
12. "Proteins in the plasma membrane undergo diffusion in a fractal environment"
Stochastic Dynamics: Models and Applications
Buenos Aires, Argentina, March 2017
13. "Anomalous diffusion and compartmentalization on the surface of mammalian cells"
Biophysical Society Meeting, New Orleans, LA, February 2017
14. "Ergodicity breaking on the neuronal surface"
Workshop on Stochasticity and Fluctuations in Small Systems
Pohang, Korea, November 2016
15. "Bulk-mediated diffusion on lipid bilayers"
Venice Meeting on Fluctuations in Small Complex Systems III
Venice, Italy, October 2016
16. "Anomalous diffusion and compartmentalization on the surface of mammalian cells"
BioNanoVision of Cellular Architecture, Barcelona, Spain, May 2016

17. "Superdiffusive motion of membrane-targeting domains"
KIAS Workshop on Anomalous Dynamics in Biological Systems
Seoul, Korea, September 2015
18. "Anomalous diffusion in the cell membrane: from diffusion in fractals to Lévy flights"
Stochastic Modeling of Anomalous Dynamics in Complex Physical and Biological Systems, Wrocław, Poland, May 2015
19. "1/f noise in intermittent fluorophores"
4th Colorado Single Molecule Membrane Meeting, Denver, CO, January 2015
20. "An actin fractal compartmentalizes the surface of mammalian cells"
Anomalous Diffusion Workshop, International Conference on Statistical Physics ($\Sigma\Phi$ 2014), Rhodes, Greece, July 2014
21. "Direct visualization of the plasma membrane fractal compartmentalization"
3rd Colorado Single Molecules in Membranes Meeting (CSMMM)
Denver, CO, January 2014
22. "Subdiffusion-enhanced reactions on the surface of mammalian cells"
Dynamics of Crowded Systems, Potsdam, Germany, October 2013
23. "High-resolution imaging of Nav1.6 trafficking in live hippocampal neurons"
Ion Channel Biophysics, Telluride, CO, August 2013
24. "Anomalous diffusion on the plasma membrane enhances endocytic reactions"
Single Molecule Dynamics Workshop, Telluride, CO, August 2013
25. "Fractional Brownian motion on the surface of mammalian cells enhances endocytic reactions"
Search and Exploration, Cargèse, Corsica, June 2013
26. "Catch and release of cargo by clathrin coated pits"
Colorado Single Molecule in Membranes Meeting (CSMMM)
Ft. Collins, CO, December 2012
27. "Ergodicity breaking and aging in the plasma membrane"
Fluctuations in Small Complex Systems, Venice, Italy, October 2012
28. "Role of endocytosis on the ergodicity breaking in the plasma membrane"
Colorado Single Molecule Membrane Conference, Boulder CO, December 2011
29. "Localization and transport of Kv2.1 channels"
Biophysics of Ion Channels Workshop, Telluride, CO, August 2011
30. "New regulatory pathways in the plasma membrane: ergodicity breaking, obstructed diffusion and nanoscale organization"

Molecular and Cellular Biophysics Symposium, University of Denver
Denver, CO, April 2011

31. "Dynamics of Kv2.1 channels in mammalian cells"
Ion Channel Biophysics Workshop, Telluride, CO, August 2009
32. "Dynamics of Kv2.1 channel cluster formation in mammalian cells"
APS - American Physical Society March Meeting, Pittsburgh, PA, March 2009
33. "Probing diffusion on the nanometer scale using electrochemistry"
First International Nanofluidics Workshop, Boekelo, Netherlands, 2005

INVITED DEPARTMENTAL SEMINARS AND COLLOQUIA

1. "Spatiotemporal dynamics of membrane receptors"
ANDI Seminars, The Institute of Photonic Sciences (ICFO), October 2020
2. "Developing Blood Compatible-Materials: An Interdisciplinary Approach Yields New Biophysical Insights from Biomimicry and Single-Molecule Microscopy"
Department of Chemical and Biological Engineering, Colorado State University
Fort Collins, CO, September 2020
3. "Single-molecule localization microscopy"
Reproduction Seminar Series. Institute of Biology and Experimental Medicine (IBYME), CONICET May 2020
4. "Real-time tracking of ion channels shows anomalous diffusion and compartmentalization on the surface of mammalian cells"
Colloquium, Centro de Investigaciones en Bionanociencias (CIBION), CONICET
Buenos Aires, Argentina, April 2019
5. "Real-time tracking of ion channels shows anomalous diffusion and compartmentalization on the surface of mammalian cells"
Seminar, Institute of Biology and Experimental Medicine (IBYME), CONICET
Buenos Aires, Argentina, April 2019
6. "Real-time tracking of ion channels shows anomalous diffusion and compartmentalization on the surface of mammalian cells"
Institutional Seminar, Instituto de Biología Molecular y Celular de Rosario (IBR)
Rosario, Argentina, February 2019
7. "Anomalous diffusion on the surface of mammalian cells"
Biophysics Seminar, Department of Physics, Bar Ilan University
Ramat Gan, Israel, June 2018
8. "Anomalous diffusion on the surface of mammalian cells"
Biological Physics Seminar, Racah Institute of Physics
Hebrew University of Jerusalem, Jerusalem, Israel, June 2018

9. "Nonergodic dynamics in the plasma membrane of living cells"
Department of Physics, "Sapienza" University of Rome
Rome, Italy, May 2018
10. "Anomalous diffusion on the surface of mammalian cells"
Department of Physics, Tokyo University of Science
Noda-shi, Japan, May 2018
11. "Real-time tracking of ion channels shows anomalous diffusion and compartmentalization on the surface of mammalian cells"
Institute of Advanced Science, Hong Kong University of Science and Technology
Hong Kong, May 2018
12. "Dynamic organization of the plasma membrane in mammalian cells"
School of Biomedical Engineering, Colorado State University
Fort Collins, CO, December 2016
13. "Dynamic organization of the plasma membrane in mammalian cells"
Veterinary & Animal Sciences, University of Massachusetts Amherst
Amherst, MA, October 2016
14. "Anomalous diffusion and compartmentalization on the surface of mammalian cells"
Department of Applied Mathematics, Wrocław University of Technology
Wrocław, Poland, July 2016
15. "Anomalous diffusion and weak ergodicity breaking on the surface of mammalian cells"
Physics Department, Università degli Studi di Roma "La Sapienza"
Rome, Italy, July 2016
16. "Anomalous diffusion and weak ergodicity breaking on the surface of mammalian cells"
Atomic, Molecular & Optical Physics Seminar, University of Delaware
Newark, DE, April 2016
17. "Anomalous diffusion on the surface of mammalian cells"
Applied Math Seminar, Colorado State University, Fort Collins, CO, March 2016
18. "Anomalous diffusion in the plasma membrane"
Department of Biological Sciences, University of Denver, Denver, CO, April 2015
19. "Anomalous diffusion in the plasma membrane"
Albert Einstein College of Medicine, New York, NY, June 2014
20. "Anomalous diffusion and weak ergodicity breaking on the surface of mammalian cells"
Physics Colloquium, University of New Mexico, Albuquerque, NM, April 2013
21. "Anomalous diffusion and ergodicity breaking on the cell surface"
Department of Physics, Colorado School of Mines, Golden, CO, January 2013

22. "Understanding diffusion and trafficking in mammalian cells with particle tracking"
Computational Optical Sensing and Imaging (COSI) Seminar, CU Boulder
Boulder, CO, October 2012
23. "Anomalous diffusion and ergodicity breaking in the plasma membrane: the role of endocytosis"
Department of Chemistry, University of Colorado, Denver, CO, May 2012
24. "Anomalous diffusion and ergodicity breaking in the plasma membrane"
Molecular, Cellular and Integrative Neurosciences, Colorado State University
Fort Collins, CO, April 2012
25. "Anomalous diffusion and ergodicity breaking in the plasma membrane: the role of endocytosis"
The Clore Center for Biological Physics, Weizmann Institute
Rehovot, Israel, January 2012
26. "Anomalous diffusion and ergodicity breaking in the plasma membrane: the role of endocytosis"
Department of Biotechnology Engineering, Ben-Gurion University of the Negev
Beer Sheva, Israel, January 2012
27. "Anomalous diffusion and ergodicity breaking in the plasma membrane: the role of endocytosis"
Biological and Soft Matter Seminar, Tel Aviv University
Tel Aviv, Israel, January 2012
28. "Anomalous diffusion and ergodicity breaking in the plasma membrane: the role of endocytosis"
Physics Department & Institute of Nanotechnology, Bar Ilan University
Ramat Gan, Israel, January 2012
29. "Non-conducting functions of the Kv2.1 potassium channel on the cell surface"
Faculty of Medicine, The Hebrew University of Jerusalem
Jerusalem, Israel, January 2012
30. "Clathrin-mediated endocytosis induces anomalous diffusion and ergodicity breaking on the surface of mammalian cells"
Racah Institute of Physics, The Hebrew University of Jerusalem
Jerusalem, Israel, January 2012
31. "Los clusters de Kv2.1 en la superficie celular funcionan como plataformas especializadas para el tráfico intracelular"
Institute of Molecular and Cell Biology of Rosario, Facultad de Ciencias Biológicas y Farmacéuticas, Universidad Nacional de Rosario
Rosario, Argentina, November 2011

32. "New regulatory pathways in the plasma membrane: ergodicity breaking, obstructed diffusion and nanoscale organization"
Materials Research Science and Engineering Center (MRSEC)
University of Pennsylvania, Philadelphia, PA, May 2011
33. "Pores and channels in nanoscale biophysics"
Department of Biochemistry, Colorado State University, Fort Collins, CO, May 2009
34. "Pores and channels in nanoscale biophysics"
Department of Physics, Colorado State University, Fort Collins, CO, April 2009
35. "Pores and channels in nanoscale biophysics"
Department of Mathematics, Colorado State University
Fort Collins, CO, March 2009
36. "Studying ion channels in live cells, one molecule at a time"
Optical Society of America (OSA) Rocky Mountain Chapter
University of Colorado at Boulder, Boulder, CO, May 2009
37. "Probing live-cell membrane dynamics with quantum dots"
Agilent, Fort Collins, CO, February 2009
38. "Solid-state nanopores for single-molecule biophysics"
Department of Physics, Oregon State University, Corvallis, OR, February 2008
39. "Solid-state nanopores for single-molecule biophysics"
School of Biomedical Engineering, Colorado State University
Fort Collins, CO, February 2008
40. "Solid-state nanopores for single-molecule biophysics"
IEEE Engineering in Medicine and Biology (EMBS) Denver Chapter
Colorado State University, Fort Collins, CO, November 2007
41. "Solid-state nanopores for single-molecule biophysics"
Department of Physics, Bar Ilan University, Ramat Gan, Israel, June 2007
42. "Solid-state nanopores for single-molecule biophysics"
Center for Nanoscience and Nanotechnology, Hebrew University of Jerusalem
Jerusalem, Israel, March 2007
43. "Nanopores as single-molecule sensors"
Department of Physics and Astronomy, University of Pittsburg
Pittsburg, PA, April 2007
44. "Nanopores as single-molecule sensors"
Department of Physics and Astronomy, University of Denver
Denver, CO, March 2007

45. "Nanopores as single-molecule sensors"
Department of Electrical and Computer Engineering, Colorado State University
Fort Collins, CO, March 2007
46. "Nanopores as single-molecule sensors"
Department of Applied Physics and Applied Math, Columbia University
New York, NY, March 2007
47. "Nanopores as single-molecule sensors"
Department of Physics, Georgetown University, Washington, DC, February 2007
48. "Nanopores as single-molecule sensors"
Department of Physics, McGill University, Montreal, Canada, February 2007
49. "Nanopores as single-molecule sensors"
Department of Physics, University of Arizona, Tucson, AZ, January 2007
50. "Nanopores as single-molecule sensors"
Facultad de Ciencias Exactas, Universidad Nacional de Rosario
Rosario, Argentina, December 2006
51. "Nanopores as single-molecule sensors"
Department of Physics and Astronomy, University of Kansas
Lawrence, KS, November 2006
52. "Probing protein-DNA interactions with nanopores"
Instituto de Biotecnología de Rosario, Universidad Nacional de Rosario
Rosario, Argentina, April 2006
53. "Optical properties of InAs nanocrystals"
Department of Physics, Universidad Nacional de Rosario
Rosario, Argentina, May 2003

CONTRIBUTED CONFERENCE PRESENTATIONS

1. "Blood protein interaction with nanostructured glycocalyx mimetic surface"
(presented by Mohammadhasan Hedayati) American chemical Society National Meeting, Boston, MA, August 2018
2. "Glycocalyx mimetic surfaces reduce blood protein adsorption and fibrin polymerization"
(presented by Mohammadhasan Hedayati) American Chemical Society National Meeting, Boston MA, August 2018
3. "Non-ergodic dynamics on the surface of mammalian cells"
Search and problem solving by random walks: drunkards vs quantum computers
Bad Honnef, Germany, May 2018

4. "Kv2.1-induced ER/PM junctions modify the cell surface diffusion landscape", (presented by Laura Solé), Biophysical Society Meeting
San Francisco, CA, February 2018
5. "Neuronal Kv2.1 clusters influence the diffusion landscape of the adjacent astrocyte membrane", (presented by Ashley Leek)
Biophysical Society Meeting, San Francisco, CA, February 2018
6. "Single-molecule TIRF microscopy studies of picornaviral replication proteins on supported bilayer surfaces", (presented by Grace Campagnola)
Biophysical Society Meeting, San Francisco, CA, February 2018
7. "Protein interaction with glycocalyx-mimetic surfaces: A candidate for blood-compatible materials", (presented by Mohammadhasan Hedayati)
5th Colorado Single Molecules in Membranes Meeting, Denver, CO, January 2018
8. "Single-molecule tracking of the mu opioid receptor as an effector-independent assay of receptor activity", (presented by Marissa Metz)
5th Colorado Single Molecules in Membranes Meeting, Denver, CO, January 2018
9. "Neuronal Kv2.1 clusters influence the diffusion landscape of the adjacent astrocyte membrane" (presented by Ashley Leek)
15th Front Range Neuroscience Group Meeting, Fort Collins, CO, December 2017
10. "Investigating single molecule tracking of the mu opioid receptor as an effector-independent assay of receptor activity" (presented by Marissa Metz)
15th Front Range Neuroscience Group Meeting, Fort Collins, CO, December 2017
11. "F-actin live cell staining with SiR actin reveals specific dynamic changes during mouse sperm acrosomal exocytosis" (presented by Ana Romarowski)
Joint Meeting of Bioscience Societies, Buenos Aires, Argentina, November 2017
12. "Protein kinase A: Being in the right place at the right time"
(presented by Cintia Stival), Joint Meeting of Bioscience Societies
Buenos Aires, Argentina, November 2017
13. "Nucleus dynamics in budding yeast" (presented by Carsten Dietvorst)
Annual Meeting of the APS Four Corners Section, Fort Collins, CO, October 2017
14. "Visualizing the cytoskeleton architecture of mammalian sperm flagella"
(presented by Terrance Bishop), Annual Meeting of the APS Four Corners Section
Fort Collins, CO, October 2017
15. "The plasma membrane is compartmentalized by a fractal actin meshwork"
(presented by Patrick Mannion), BMES Annual Meeting, Phoenix, AZ, October 2017
16. "Super-Resolution Imaging of Live Sperm Reveals Specific Dynamic Changes of The Actin Cytoskeleton During Acrosomal Exocytosis" (presented by Ana Romarowski)

51st Annual Meeting of the Society for Study of Reproduction (SSR)
New Orleans, LA, July 2018

17. "3D super-resolution imaging of mammalian sperm actin cytoskeleton"
(presented by Xinran Xu) Front Range Cytoskeleton Meeting
Denver, CO, June 2017
18. "The plasma membrane is compartmentalized by a self-similar cortical actin fractal"
(presented by Sanaz Sadegh), American Physical Society March Meeting
New Orleans, LA, March 2017
19. "Agonist dependent alterations of mu opioid receptor mobility"
(presented by Reagan Pennock), 14th Front Range Neuroscience Group Meeting
Fort Collins, CO, December 2016
20. "Single molecule TIRF microscopy studies of picornaviral replication proteins on
supported bilayer surfaces" (presented by Grace Heaslip)
Annual Meeting of the American Society for Virology, Blacksburg, VA, June 2016
21. "The plasma membrane is compartmentalized by a self-similar cortical actin fractal"
(presented by Sanaz Sadegh), Front Range Cytoskeleton Meeting
Denver, CO, June 2016
22. "3D super-resolution imaging of mammalian sperm" (presented by Xinran Xu)
Front Range Cytoskeleton Meeting, Denver, CO, June 2016
23. "Superdiffusive motion of membrane-targeting domains"
Biophysical Society Meeting, Los Angeles, CA, March 2016
24. "Superdiffusive motion of membrane-targeting C2 domains"
(presented by Kanti Nepal) Colorado Photonics Industry Association Meeting
Boulder, CO, November 2015
25. "Fractal structure of cortical actin in mammalian cells" (presented by Sanaz Sadegh)
Colorado Photonics Industry Association Meeting
Boulder, CO, November 2015
26. "Biomechanical role for cardiac jelly in pumping mechanics of developing heart during
looping" (presented by David Bark)
Summer Biomechanics, Bioengineering and Biotransport Conference (SB³C2015)
Snowbird, UT, June 2015
27. "A self-similar actin structure compartmentalizes the surface of mammalian cells"
Front Range Cytoskeleton Meeting (FRCM 2015), Boulder, CO, May 2015
28. "Visualizing the compartmentalization of the surface of mammalian cells by cortical
actin with superresolution" (presented by Sanaz Sadegh)
Biophysical Society Meeting, Baltimore, MD, February 2015

29. "Does cell shape determine cell fate?" (presented by Samanthe Lyons)
Biophysical Society Meeting, Baltimore, MD, February 2015
30. "An actin fractal compartmentalizes the surface of mammalian cells"
Single Molecule Biophysics 2015 (SMB), Aspen CO, January 2015
31. "Force spectroscopy in the bloodstream of live embryonic zebrafish with optical tweezers", (presented by Bryce Schroder)
Colorado Photonics Industry Association Annual Meeting
Boulder, CO, October 2014
32. "Visualizing the compartmentalization of the surface of mammalian cells by cortical actin with superresolution" (presented by Sanaz Sadegh)
Colorado Photonics Industry Association Annual Meeting
Boulder, CO, October 2014
33. "Force spectroscopy in the bloodstream of live embryonic zebrafish with optical tweezers" (presented by Bryce Schroder)
Frontiers in Optics, Tucson, AZ, October 2014
34. "Quantifying the dynamic interactions between a clathrin-coated pit and cargo molecules"
American Physical Society, Denver, CO, March 2014
35. "Critical exponents describing non-stationary $1/f$ noise for intermittent quantum dots"
(presented by Sanaz Sadegh) American Physical Society, Denver, CO
March 2014
36. "Quantifying the dynamic interactions between a clathrin-coated pit and cargo molecules"
Biophysical Society Meeting, San Francisco, CA, February 2014
37. "Single-particle tracking PALM of Nav1.6 in hippocampal neurons demonstrates unique subcellular diffusion landscapes" (presented by Liz Akin)
Biophysical Society Meeting, San Francisco, CA, February 2014
38. "Induction of endoplasmic reticulum-plasma membrane contacts is a non-conducting function of the Kv2.1 voltage-gated potassium channel" (presented by Phil Fox)
Biophysical Society Meeting, San Francisco, CA, February 2014
39. "Endoplasmic reticulum-plasma membrane contacts function as membrane protein trafficking hubs at the neuronal soma" (presented by Phil Fox)
11th Front Range Neuroscience Group Meeting, Fort Collins, CO December 2013
40. "Single particle tracking of Nav1.6 molecules demonstrates different mechanisms for sodium channel anchoring within the AIS versus the soma of hippocampal neurons"
(presented by Liz Akin), 11th Front Range Neuroscience Group Meeting
Fort Collins, CO, December 2013

41. "Endoplasmic reticulum/plasma membrane junctions function as membrane protein trafficking hubs" (presented by Phil Fox)
Biophysical Society Meeting, Philadelphia, PA, February 2013
42. "Measuring the binding energy between cargo and forming clathrin-coated pits",
Biophysical Society Meeting, Philadelphia, PA, February 2013
43. "Kv2.1 cell surface clusters promote maturation of clathrin-coated pits"
(presented by Aubrey Weigel) Biophysical Society Meeting,
Philadelphia, PA, February 2013
44. "Single-particle tracking of Nav1.6 demonstrates different mechanisms for sodium channel anchoring within the AIS versus the soma of hippocampal neurons"
(presented by Liz Akin) Biophysical Society Meeting
Philadelphia, PA, February 2013
45. "Single-particle tracking of Nav1.6 suggests a novel anchoring mechanism and demonstrates direct trafficking to the AIS" (presented by Liz Akin)
10th Front Range Neuroscience Group Meeting, Fort Collins, CO, December 2012
46. "Endoplasmic reticulum/plasma membrane junctions function as membrane protein trafficking hubs at the neuronal perikaryon" (presented by Phil Fox)
10th Front Range Neuroscience Group Meeting, Fort Collins, CO, December 2012
47. "Combining super-resolution imaging and single particle tracking in living cells to probe interactions between actin and membrane proteins"
Nano Measure Symposium, Stanford University, Palo Alto, CA, June 2012
48. "Anomalous diffusion and ergodicity breaking on the surface of mammalian cells"
CSU Research Colloquium, Physics at CSU: Neutrinos to Nanoscience
Fort Collins, CO, March 2012
49. "Clathrin-mediated endocytosis introduces a nonergodic diffusion process in the plasma membrane"
Biophysical Society Meeting, San Diego, CA, February 2012
50. "Rapid cell surface Kv2.1 recycling observed by single molecule tracking"
(presented by Aubrey Weigel), Biophysical Society Meeting
San Diego, CA, February 2012
51. "Kv2.1 cell surface clusters are insertion and retrieval platforms for Kv channel trafficking at the plasma membrane" (presented by Phil Fox)
Biophysical Society Meeting, San Diego, CA, February 2012
52. "Combining super-resolution imaging and single particle tracking in living cells to probe interactions between actin and plasma membrane proteins"
(presented by Jenny Higgins) Biophysical Society Meeting
San Diego, CA, February 2012

53. "Analysis of voltage-gated sodium channel membrane dynamics in hippocampal neurons via a fluorescent protein and biotin tagged Nav1.6 channel"
(presented by Liz Akin) Biophysical Society Meeting
San Diego, CA, February 2012
54. "A novel fluorescent protein and biotin tagged Nav1.6 channel allows analysis of voltage-gated sodium channel dynamics in hippocampal neurons"
(presented by Liz Akin) American Society for Cell Biology Annual Meeting
Denver, CO, December 2011
55. "Cortical actin modulates trafficking of the Kv2.1 channel to the cell surface"
(presented by Aubrey Weigel) American Society for Cell Biology Annual Meeting
Denver, CO, December 2011
56. "Kv2.1 cell surface clusters are insertion and retrieval platforms for membrane protein delivery to the plasma membrane"
(presented by Emily Deutsch) American Society for Cell Biology Annual Meeting
Denver, CO, December 2011
57. "Dynamic super-resolution PALM imaging of the actin cytoskeleton in living mammalian cells" (presented by Jenny Higgins)
American Society for Cell Biology Annual Meeting, Denver, CO, December 2011
58. "Single molecule approaches to examining voltage-gated sodium channel localization and function" (presented by Liz Akin)
Colorado Single Molecule Membrane Meeting, Boulder, CO, December 2011
59. "Kv2.1 diffusion and rapid cell surface recycling observed by single molecule tracking"
(presented by Aubrey Weigel) Colorado Single Molecule Membrane Meeting
Boulder, CO, December 2011
60. "A novel fluorescent protein and biotin tagged Nav1.6 channel allows analysis of voltage-gated sodium channel dynamics in hippocampal neurons"
(presented by Liz Akin), 9th Front Range Neuroscience Group Meeting
Fort Collins, CO, December 2011
61. "Kv2.1 cell surface clusters are insertion and retrieval platforms for ion channel trafficking at the plasma membrane" (presented by Emily Deutsch)
9th Front Range Neuroscience Group Meeting, Fort Collins, CO, December 2011
62. "Mechanism of Kv2.1 channel clustering" (presented by Aubrey Weigel)
ICBP2011 - International Conference of Biological Physics
San Diego, CA, June 2011
63. "New regulatory pathways in the plasma membrane: ergodicity breaking, obstructed diffusion and nanoscale organization"

ICBP2011 - International Conference of Biological Physics
San Diego, CA, June 2011

64. "Mechanism of Kv2.1 channel clustering" (presented by Aubrey Weigel)
Molecular and Cellular Biophysics Symposium, University of Denver
Denver, CO, April 2011
65. "Detection of infectious disease markers using photoactivatable ligands"
(presented by Kristen Jevsevar), Molecular and Cellular Biophysics Symposium
University of Denver, Denver, CO, April 2011
66. "Tracking single Kv2.1 channels in live cells reveals anomalous subdiffusion and
ergodicity breaking" (presented by Aubrey Weigel)
APS - American Physical Society March Meeting, Dallas, TX, March 2011
67. "A new paradigm in single-particle tracking in live cells: Onset of ergodicity breaking"
Biophysical Society Meeting, Baltimore, MD, February 2011
68. "Kv2.1 anomalous diffusion observed by single molecule tracking"
EMBC2010 - IEEE Engineering in Biology and Medicine
Buenos Aires, Argentina, September 2010
69. "Anomalous diffusion and weak ergodicity breaking of Kv2.1 channels observed by
single molecule tracking in live cells" (presented by Aubrey Weigel)
American Physical Society 4-Corners Meeting. Ogden, UT, October 2010
70. "Solid-state nanopore recognition and measurement using Shannon entropy"
(presented by Ty Wojcik) American Physical Society 4-Corners Meeting
Ogden, UT, October 2010
71. "Single molecule Kv2.1 channel dynamics in live mammalian cells"
Biophysical Society Meeting, San Francisco, CA, February 2010
72. "Field-friendly tuberculosis biosensors" (presented by Nathan Proper)
APS - American Physical Society March Meeting, Portland, OR. March 2010
73. "Dynamics of Kv2.1 channels in live mammalian cells"
ASCB2009 - American Society for Cell Biology, San Diego, CA, December 2009
74. "Tracking single potassium channels in live mammalian cells"
Laser Science XXV, San Jose, CA, October 2009
75. "Fluorescence immunoassay for the detection of latent tuberculosis antigens with
single molecule sensitivity"
FiO2009 - Frontiers in Optics, San Jose, CA, October 2009
76. "Probing DNA and Protein-DNA interactions with solid-state nanopores"
Biophysical Society Meeting, Baltimore, MD, March 2007

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77. "Pulling DNA through nanopores with optical tweezers"
DNA and Chromosomes 2006: Physical and Biological Approaches
Cargèse, Corsica, France, July 2006
78. "Anomalous ionic transport at nanometer scale electrodes"
APS - American Physical Society March Meeting, Baltimore, MD, March 2006
79. "Ion transport at the nanoscale"
Screening, Charge Inversion and Condensation of Macroions
Leiden, Netherlands, September 2005
80. "Probing diffusion on the nanometer scale using electrochemistry"
APS - American Physical Society March meeting, Los Angeles, CA, March 2005
81. "Infrared photo-induced absorption spectroscopy of porous silicon"
PSST2002 - 3rd International Conference on Porous Semiconductors Science and
Technology, Tenerife, Spain, March 2002
82. "Inter-valence-band absorption and photocurrent spectroscopy of Si/Si_xGe_{1-x} quantum
well"
ITQW2001 - 6th International Conference on Intersubband Transitions in Quantum
Wells, Asilomar, CA, September 2001
83. "Infrared inter-sub-level spectroscopy of porous silicon nanostructures"
ITQW2001 - 6th International Conference on Intersubband Transitions in Quantum
Wells, Asilomar, CA, September 2001

RESEARCH SUPPORT

PHY 0956714 - Diego Krapf PI 07/01/2010 – 12/30/2013
National Science Foundation, Role: PI
Membrane dynamics underlying Kv2.1 cluster formation
Total amount: \$453,565 Krapf Lab amount: \$340,831

Nick Fisk PI 08/01/2011 – 07/30/2012
Infectious Disease Supercluster, Role: co-PI
Transformative improvements in field ready biosensor platform development through protein
assembly engineering and device integration
Total amount: \$95,000 Krapf Lab amount: \$18,500

1R01NS085142 – Michael Tamkun PI 09/30/2013 – 07/31/2017
**National Institute of Neurological Disorders and Stroke (NINDS) of the National
Institutes of Health**
High Resolution Optical Analysis of Nav1.6 Localization, Trafficking and Function
Role: Collaborator
Total amount: \$1,294,866 Krapf Lab amount: \$103,589

DIEGO KRAPF

1R21AI111588 – Olve Peersen PI 04/01/2014 – 03/31/2017
National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health

Imaging viral RNA genome replication at the single molecule level

Role: Co-I

Total amount: \$399,829 Krapf Lab amount: \$199,914

PHY-1401432 - Diego Krapf PI 09/01/14 – 08/31/2018

National Science Foundation, Role: PI

Structure and Functions of ER/Plasma Membrane Junctions

Total amount: \$540,000 Krapf Lab amount: \$378,000

DBI-1531921 – Matt Kipper PI 08/15/15 – 07/30/2018

National Science Foundation, Role: co-PI

MRI: Acquisition of Combined Spinning Disc Confocal/Atomic Force Microscopy System

Total amount: \$638,997

1R01GM109888 – Michael Tamkun PI 07/01/2014 – 05/31/2019

National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health

Structural and Functional Interactions within the Neuronal ER/PM Junction

Role: Collaborator

Total amount: \$1,509,274 Krapf Lab amount: \$356,260

CBET-1511830 – Matt Kipper PI 08/15/15 – 08/14/2019

National Science Foundation, Role: co-PI

UNS: Understanding protein adsorption in polysaccharide brushes

Total amount: \$400,000 Krapf Lab amount: \$ 62,970

R01NS112365– Michael Tamkun PI 02/01/2020 – 01/31/2025

National Institute of Neurological Disorders and Stroke (NINDS) of the National Institutes of Health

Neuronal Cell Biology of Kv2.1-induced Endoplasmic Reticulum/Plasma Membrane

Contact Sites

Role: Co-I

Total amount: \$1,601,051

OUTREACH

STEM activities at Olander School for Project Based Learning 2010-2019

Development of Microscopy Lab for fifth grade at Olander School for Project Based Learning (funded by the National Science Foundation) 2015-2016