

Matthew D. Hirschey, Ph.D.

Associate Professor, Departments of Medicine and Pharmacology & Cancer Biology
Director, Duke Center for Computational Thinking
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SUMMARY

Matthew Hirschey is a tenured Associate Professor at Duke University, Director of the Center for Computational Thinking, and a faculty member of the Duke Molecular Physiology Institute. His career has been shaped by an unusual pattern: each phase of his training pulled him into a new discipline, and each transition deepened rather than replaced what came before.

His scientific foundation is in chemistry. A Ph.D. in Chemistry and Biochemistry at UC Santa Barbara with Alison Butler taught him to think at the molecular level, where he built semiconductor nanocrystals and combined them with living cells. That work at the interface of inorganic chemistry and microbiology gave him an instinct for crossing disciplinary boundaries that has defined his career since.

As a postdoctoral fellow with Eric Verdin at the Gladstone Institutes, he moved from chemistry into metabolic physiology and discovered new regulatory functions of protein acetylation in mitochondria. The transition from synthesizing materials to studying living systems was deliberate: he wanted to understand how chemistry governs biology, not just model it.

At Duke since 2011, his lab studies how cells integrate nutrient sensing and metabolism, with a focus on how post-translational modifications control mitochondrial function. Over the past decade, computational and data-driven approaches have become central to this work. He did not start as a computational scientist. He became one because the questions demanded it, teaching himself to code, building data pipelines, and eventually integrating machine learning into the lab's discovery workflow. That firsthand experience of learning computational methods as an experimentalist led directly to founding the Center for Computational Thinking in 2021, a university-wide initiative that now spans four schools at Duke.

The result is a scientist whose work sits at the intersection of chemistry, biology, metabolism, and computation. His publications in *Nature*, *Science*, *Cell Metabolism*, and *Molecular Cell* reflect this range. So do his funding sources: the NIH, the DOD, and OpenAI. The combination of deep bench science experience and institutional leadership in computational education is unusual, and it shapes how he approaches both research and the future of scientific training.

RESEARCH EXPERIENCE

Director

Duke Center for Computational Thinking
Duke University
August 2021 – Present

Associate Professor (tenure)

Department of Medicine, Division of Endocrinology, Metabolism, and Nutrition
Duke University Medical Center
March 2019 – Present

Associate Professor – Joint Appointment

Cardiovascular and Metabolic Disorders Signature Research Program

Duke-NUS, Singapore
July 2018 – Present

Faculty Member

Duke Center for Genomic and Computational Biology
Duke University Medical Center
November 2018 – Present

Faculty Member

Duke Molecular Physiology Institute
Duke University Medical Center
July 2013 – Present

Faculty Member

Duke Cancer Institute
Duke University Medical Center
April 2012 – Present

Faculty Member

Cardiovascular Research Center
Duke University Medical Center
April 2011 – Present

Faculty Member

Sarah W. Stedman Nutrition and Metabolism Center
Duke University Medical Center
April 2011 – Present

Associate Professor (tenure track)

Department of Medicine, Division of Endocrinology, Metabolism, and Nutrition
Duke University Medical Center
September 2015 – February 2019

Assistant Professor (tenure track)

Department of Medicine, Division of Endocrinology, Metabolism, and Nutrition
Department of Pharmacology & Cancer Biology
Duke University Medical Center
April 2011 – September 2015

Research Scientist

Gladstone Institute of Virology & Immunology
University of California – San Francisco
December 2010 – April 2011

Post-Doctoral Research Fellow

Gladstone Institute of Virology & Immunology
University of California – San Francisco
Advisor: Eric Verdin, September 2006 – December 2010

Research theme: protein acetylation, deacetylation by mammalian sirtuins (SIRT6), and the regulation of mitochondrial metabolism and metabolic diseases

Graduate Research Scientist

University of California – Santa Barbara, Department of Chemistry
Advisor: Alison Butler, September 2001 – September 2006
Thesis Title: *“Imaging Bacterial Dynamics with CdSe/CdS Quantum Dots”*

Research objective: Synthesize and functionalize semiconductor nanocrystals for novel biological imaging applications

Undergraduate HELiX Research Technician

University of Vermont, Department of Chemistry

Advisor: Christopher Landry, September 1999 – June 2001

Thesis title: “*Antigen Selective Chromatography Using Mesoporous Silica*”

Undergraduate Research Technician

University of Vermont, Department of Medicine

Advisor: Naomi Fukagawa, December 1998 – September 1999

Project Title: “*GSH Concentrations in Cells Exposed to Different Levels of Glucose*”

EDUCATION

Doctor of Philosophy, Chemistry & Biochemistry, September 2006

Department of Chemistry & Biochemistry

University of California – Santa Barbara

Santa Barbara, CA

Bachelor of Science, Biological Sciences, June 2001

College of Agriculture and Life Sciences

University of Vermont

Burlington, VT

HONORS & AWARDS

Award	Year
Duke Department of Medicine Outstanding Mentor Award	2020
2019 Blavatnik National Awards for Young Scientists Nominee	2019
Glenn Award for Research in Biological Mechanisms of Aging	2018
Chancellor’s Discovery Award	2015
Helmholtz Young Investigator in Diabetes (HeIDi) Award	2013
Ellison Medical Foundation New Scholar in Aging Award	2013
Duke Leadership Development for Researchers (LEADER) Program	2013
Duke Department of Medicine Faculty Development Academy	2012
Central Society for Clinical Research Early Career Development Award	2012
AFAR Dorothy Dillon Eweson Advances in Aging Research Award	2010
UCSF Post-Doctoral Teaching Award	2010
Sandler Fellowship/Program in Breakthrough Biomedical Research Award	2010

Award	Year
Gladstone GIVI Postdoctoral Award of Excellence in Science	2009
Gordon Conference on Oxidative Stress & Disease Award	2009
UCSF Post-Doctoral Teaching Award	2009
University of Vermont Unsung Hero Award	2001
Boulder Society Member	2001
Alpha Zeta Academic Fraternity Member	2001
Eagle Scout	1997

PROFESSIONAL

Activity	Year
SAGE Subject Matter Expert, Science and Technology Directorate (S&T), Department of Homeland Security (DHS)	2024 – Present
American Diabetes Association Scientific Sessions Meeting Planning Committee	2020 – 2022
American Diabetes Association Scientific Sessions <i>Ad Hoc</i> Committee	2016, 2019

WRITING

Journal Publications

1. Imaging *Escherichia coli* using functionalized core/shell CdSe/CdS quantum dots. MD Hirschey, Y-J Han, GD Stucky, A Butler. *J. Biol. Inorg. Chem.* (2006) 11: 663-669
2. Mammalian Sir2 Homolog SIRT3 Regulates Global Mitochondrial Lysine Acetylation. DB Lombard, FW Alt, HL Cheng, J Bunkenborg, RS Streeper, R Mostoslavsky, J Kim, G Yancopoulos, D Valenzuela, A Murphy, Y Yang, Y Chen, MD Hirschey, RT Bronson, M Haigis, LP Guarente, RV Farese Jr, S Weissman, E Verdin, B Schwer. *Mol. Cell. Biol.* (2007) 27: 8807-8814
3. Chapter 8: acetylation of mitochondrial proteins. MD Hirschey*, T Shimazu*, J-Y Huang*, E Verdin. *Meth. Enzymol.* (2009) 457: 137-147
4. SIRT3 regulates mitochondrial fatty acid oxidation via reversible enzyme deacetylation. MD Hirschey, T Shimazu, E Goetzman, E Jing, B Schwer, DB Lombard, CA Grueter, C Harris, SB Biddinger, OR Ilkayeva, RD Stevens, Y Li, AK Saha, NB Ruderman, JR Bain, CB Newgard, RV Farese Jr., FW Alt, CR Kahn, and E Verdin. *Nature* (2010) 464: 121-125. F1000 Evaluation: 2572956
5. Mitochondrial Sirtuins. J-Y Huang*, MD Hirschey*, T Shimazu*, LT Ho, E Verdin. *Biochim. Biophys. Acta.* (2010) 1804: 1645-1651
6. Acetate metabolism and aging: an emerging connection. T Shimazu*, J-Y Huang*, MD Hirschey*, LT Ho, E Verdin. *Mech. Aging and Develop.* (2010) 131: 511-516
7. Sirtuin regulation of mitochondria - energy production, apoptosis, and signaling. E Verdin, MD Hirschey, LWS Finley, MC Haigis. *Trends Biochem. Sci.* (2010) 35: 669-675
8. SIRT3 Deacetylates Mitochondrial 3-Hydroxy-3-Methylglutaryl CoA Synthase 2, Increases its Enzymatic Activity and Regulates Ketone Body Production. T Shimazu*, MD Hirschey*, L Ha, K Ditten-

- hafer, B Schwer, DB Lombard, Y Li, J Bunkenborg, JS Andersen, FW Alt, JM Denu, MP Jacobson, and E Verdin. *Cell Metab.* (2010) 12: 654-661
9. Calorie Restriction Reduces Oxidative Stress by SIRT3-mediated SOD2 Activation. X Qiu*, K Brown*, MD Hirschey, E Verdin and D Chen. *Cell Metab.* (2010) 12: 662-667
 10. SIRT1 and SIRT3 Deacetylate Homologous Substrates: AceCS1,2 and HMGCS1,2. MD Hirschey*, T Shimazu*, JA Capra*, KS Pollard, and E Verdin. *Aging* (2011) 3:1-8
 11. SIRT3 Deficiency and Mitochondrial Protein Hyperacetylation Accelerate the Development of the Metabolic Syndrome. MD Hirschey, T Shimazu, E Jing, CA Grueter, AM Collins, B Aouizerat, A Stančáková, E Goetzman, MM Lam, B Schwer, RD Stevens, MJ Muehlbauer, S Kakar, NM Bass, J Kuusisto, M Laakso, FW Alt, CB Newgard, RV Farese Jr., CR Kahn and E Verdin. *Mol. Cell* (2011) 44:177-190
 12. Sirtuin-3 (Sirt3) regulates skeletal muscle metabolism and insulin signaling via altered mitochondrial oxidation and reactive oxygen species production. E Jing, B Emanuelli, MD Hirschey, J Bucher, KY Lee, DB Lombard, E Verdin, and CR Kahn. *PNAS* (2011) 108:14608-14613
 13. Old Enzymes, New Tricks: Sirtuins Are NAD(+)-Dependent De-acylases. MD Hirschey. *Cell Metab.* (2011) 14: 718-719
 14. SIRT3 Regulates Mitochondrial Protein Acetylation and Intermediary Metabolism. MD Hirschey, T Shimazu, J-Y Huang, B Schwer, and E Verdin. *Cold Spring Harbor Symposia on Quantitative Biology, Vol. 76, Metabolism and Disease* (2011) 76: 267-77
 15. Deficiency of the lipid synthesis enzyme, DGAT1, extends longevity in mice. RS Streeper, CA Grueter, N Salomonis, S Cases, MC Levin, SK Koliwad, P Zhou, MD Hirschey, E Verdin, and RV Farese Jr. *Aging* (2012) 4: 13–27
 16. Mitochondrial Acetylome Analysis in a Mouse Model of Alcohol-Induced Liver Injury Utilizing SIRT3 Knockout Mice. KS Fritz, JJ Galligan, MD Hirschey, E Verdin, and DR Petersen. *Journal of Proteome Research* (2012) 11: 1633–1643
 17. Hepatic Insulin Signaling Is Required for Obesity-Dependent Expression of SREBP-1c mRNA but Not for Feeding-Dependent Expression. JT Haas, J Miao, D Chanda, Y Wang, E Zhao, ME Haas, M Hirschey, B Vaitheesvaran, RV Farese Jr., IJ Kurland, M Graham, R Crooke, F Fougelle, and SB Biddinger. *Cell Metab.* (2012) 15: 873–884
 18. SIRT3 Weighs Heavily in the Metabolic Balance: A New Role for SIRT3 in Metabolic Syndrome. MF Green and MD Hirschey. *J. Gerontology: Biol. Sci.* (2013) 68: 105-107
 19. Mitochondrial Protein Acetylation Regulates Metabolism. KA Anderson and MD Hirschey. *Essays in Biochemistry* (2012) 52: 23-35
 20. HINT2 and Fatty Liver Disease: Mitochondrial Protein Hyperacetylation Gives A Hint? KA Anderson*, D Wang* and MD Hirschey. *Hepatology* (2013) 57:1681-3
 21. Whole-organism screening for gluconeogenesis identifies activators of fasting metabolism. P Gut, B Baeza-Raja, O Andersson, L Hasenkamp, D Hesselson, K Akassoglou, E Verdin, MD Hirschey and DYR Stainier. *Nature Chem. Biol.* (2012) 9: 97-104
 22. Suppression of Oxidative Stress by β -Hydroxybutyrate, an Endogenous Histone Deacetylase Inhibitor. T Shimazu, MD Hirschey, J Newman, W He, K Shirakawa, N Le Moan, CA Grueter, H Lim, LR Saunders, RD Stevens, CB Newgard, RV Farese Jr., R de Cabo, S Ulrich, K Akassoglou, E Verdin. *Science* (2013) 339: 211-214. F1000 Evaluation: 717972967

23. The Sirtuins, Oxidative Stress and Aging: An Emerging Link. PI Merksamer, Y Liu, W He, MD Hirschey, D Chen, and E Verdin. *Aging* (2013) 5:144-50
24. Targeting Sirtuins for the Treatment of Diabetes. FK Huynh*, KA Hershberger*, and MD Hirschey. *Diabetes Management* (2013) 3: 245–257
25. Generating Mammalian Sirtuin Tools for Protein-Interaction Analysis. KA Hershberger, J Motley, MD Hirschey, KA Anderson. *Methods Mol. Bio.* (2013) 1077: 69-78
26. Oxygen flux analysis to understand the biological function of sirtuins. D Wang, MF Green, E McDonnell, MD Hirschey. *Methods Mol. Bio.* (2013) 1077: 241-258
27. Ethanol Metabolism Modifies Hepatic Protein Acylation in Mice. KS Fritz, MF Green, DR Petersen, MD Hirschey. *PLoS One* (2013) 8(9):e75868
28. SIRT3 regulates long-chain acyl-CoA dehydrogenase (LCAD) enzyme activity through deacetylation of conserved lysines near the active site. SS Bharathi, Y Zhang, AW Mohsen, R Uppala, M Balasubramani, E Schreiber, G Uechi, ME Beck, MJ Rardin, J Vockley, E Verdin, BW Gibson, MD Hirschey, ES Goetzman. *J. Biol. Chem.* (2013) 288:33837-33847
29. Lysine Glutarylation Is a Protein Post-Translational Modification Regulated by SIRT5. M Tan*, C Peng*, KA Anderson*, P Chhoy, Z Xie, L Dai, JS Park, Y Chen, H Huang, Y Zhang, J Ro, GR Wagner, MF Green, AS Madsen, J Schmiesing, BS Peterson, G Xu, OR Ilkayeva, MJ Muehlbauer, T Braulke, C Mühlhausen, DS Backos, CA Olsen, PJ McGuire, SD Pletcher, DB Lombard, MD Hirschey*, Y Zhao*. *Cell Metab.* (2014) 19(4):605-617. Editors Choice: JD Berndt, Modifying Mitochondrial Metabolism. *Sci. Signal.* 7, ec114 (2014)
30. Non-enzymatic protein acylation as a carbon stress regulated by sirtuin deacylases. GR Wagner and MD Hirschey. *Mol. Cell* (2014) 54(1):5-16
31. Measurement of fatty acid oxidation rates in animal tissues and cell lines. FK Huynh, MF Green, TR Koves and MD Hirschey. *Methods in Enzymology: Conceptual background and bioenergetic/mitochondrial aspects of oncometabolism* (2014) 542:391-405
32. Phosphoproteomic Profiling of Human Myocardial Tissues Distinguishes Ischemic from Non-Ischemic End Stage Heart Failure. MA Schechter, MKH Hsieh, LW Njoroge, JW Thompson, EJ Soderblom, B Feger, CD Troupes, KA Hershberger, OR Ilkayeva, WL Nagel, GP Landinez, KM Shah, VA Burns, L Santacruz, MD Hirschey, MW Foster, CA Milano, MA Moseley, V Piacentino, D Bowles. *PLoS One* (2014) 9(8):e104157
33. Acyl-CoA thioesterase-2 facilitates mitochondrial fatty acid oxidation in the liver. C Moffat, L Bhatia, T Nguyen, P Lynch, T Schneider, M Wang, D Wang, OR Ilkayeva, X Han, MD Hirschey, SM Claypool, EL Seifert. *J Lipid Res.* (2014) 55(12):2458-70
34. Mitochondria, Energetics, Epigenetics, and Cellular Responses to Stress. DT Shaughnessy, K McAllister, L Worth, AC Haugen, J Meyer, FE Domann, V Van Houten, R Mostoslavsky, SJ Bultman, AA Baccarelli, TJ Begley, R Sobol, MD Hirschey, T Ideker, JH Santos, WC Copeland, RR Tice, DM Balshaw, FL Tyson. *Environ Health Perspect.* (2014) 122:1271-8
35. Mammalian Sirtuins. KA Anderson, MF Green, FK Huynh, GR Wagner, MD Hirschey. *Cell* (2014) 159(4):956
36. Effects of aerobic training on the host systemic milieu in patients with solid tumors: an exploratory correlative study. OK Glass, BA Inman, G Broadwater, KS Courneya, JR Mackey, S Goruk, ER Nelson, J Jasper, CJ Field, JR Bain, M Muehlbauer, RD Stevens, MD Hirschey, LW Jones. *British Journal of Cancer* (2015) 112(5): 825-831

37. Metabolic regulation by lysine malonylation, succinylation, and glutarylation. MD Hirschev and YM Zhao. *Molecular and Cellular Proteomics* (2015) 14(9):2308-15
38. Neuronal CRTC-1 governs systemic mitochondrial metabolism and lifespan via a catecholamine signal. K Burkewitz, I Morantte, HJM Weir, R Yeo, Y Zhang, FK Huynh, OR Ilkayeva, MD Hirschev, AR Grant, WB Mair. *Cell* (2015) 160(5):842
39. High resolution metabolomics with acyl-CoA profiling reveals widespread remodeling in response to diet. X Liu, S Sadhukhan, S Sun, GR Wagner, MD Hirschev, L Qi, H Lin, JW Locasale. *Molecular and Cellular Proteomics* (2015) 14(6):1489-500
40. SIRT3 regulates progression and development of diseases of aging. E McDonnell*, BS Peterson*, HM Bomze, MD Hirschev. *Trends in Endo. Metab.* (2015) S1043-2760(15)
41. SIRT3 directs carbon traffic in muscle to promote glucose control. FK Huynh, DM Muoio, MD Hirschev. *Diabetes* (2015) 64(9):3058-60
42. Long-chain Acylcarnitines Reduce Lung Function by Inhibiting Pulmonary Surfactant. C Otsubo, S Bharathi, R Uppala, OR Ilkayeva, D Wang, K McHugh, Y Zou, J Wang, JF Alcorn, YY Zuo, MD Hirschev, ES Goetzman. *J. Bio. Chem.* (2015) 290(39):23897-904
43. Dysregulated metabolism contributes to oncogenesis. MD Hirschev, RJ DeBerardinis, AME Diehl, J Drew, C Frezza, MF Green, LW Jones, YH Ko, A Le, MA Lea, JW Locasale, VD Longo, CA Lyssiotis, E McDonnell, M Mehrmohamadi, G Michelotti, V Muralidhar, MP Murphy, PL Pedersen, B Poore, L Raffaghello, JC Rathmell, S Sivanand, MG Vander Heiden, KE Wellen, Target Validation Team. *Seminars in Cancer Biology* (2015) 35 Suppl:S129-50
44. Designing a broad-spectrum integrative approach for cancer prevention and treatment. Block KI, et al. *Seminars in Cancer Biology* (2015) 35 Suppl:S276-304
45. Investigating the sensitivity of NAD⁺-dependent sirtuin deacylation to NADH. AS Madsen*, C Andersen, M Daoud, KA Anderson, JS Laursen, SM Chakladar, FK Huynh, DS Backos, MD Hirschev*, CA Olsen*. *J. Biol. Chem.* (2016) 291(13):7128-41
46. Proteomic Profiling Reveals Adaptive Responses to Surgical Myocardial Ischemia-Reperfusion in Hibernating Arctic Ground Squirrels Compared to Rats. QJ Quinones, Z Zhang, Q Ma, MP Smith, E Soderblom, MA Moseley, J Bain, CB Newgard, MJ Muehlbauer, M Hirschev, KL Drew, BM Barnes, MV Podgoreanu. *Anesthesiology* (2016) 124(6):1296-310
47. Arsenite Uncouples Mitochondrial Respiration and Induces a Warburg-like Effect in *Caenorhabditis elegans*. AL Luz, TR Godebo, DP Bhatt, OR Ilkayeva, LL Maurer, MD Hirschev, JN Meyer. *Toxicol Sci.* (2016) 152(2):349-62
48. In Vivo Determination of Mitochondrial Function Using Luciferase-Expressing *Caenorhabditis elegans*: Contribution of Oxidative Phosphorylation, Glycolysis, and Fatty Acid Oxidation to Toxicant-Induced Dysfunction. AL Luz, C Lagido, MD Hirschev, JN Meyer. *Curr Protoc Toxicol* (2016) 69:25.8.1-25.8.22
49. Lipids Reprogram Metabolism to Become a Major Carbon Source for Histone Acetylation. E McDonnell, SB Crown, DB Fox, B Kitir, OR Ilkayeva, CA Olsen, PA Grimsrud, MD Hirschev. *Cell Reports* (2016) 17(6):1463-1472
50. A prob(e)able route to lysine acylation. GR Wagner and MD Hirschev. *Cell Chem. Bio.* (2017) 24(2):126-128
51. Role of NAD⁺ and mitochondrial sirtuins in cardiac and renal diseases. KA Hershberger, AS Martin, MD Hirschev. *Nature Rev. Neph.* (2017) 13(4):213-225

52. A Class of Reactive Acyl-CoA Species Reveals the Nonenzymatic Origins of Protein Acylation. GR Wagner, DP Bhatt, TM O'Connell, JW Thompson, LG Dubois, DS Backos, H Yang, GA Mitchell, OR Ilkayeva, RD Stevens, PA Grimsrud, MD Hirschev. *Cell Metab.* (2017) 25(4):823-837
53. SIRT4 is a Lysine Deacylase That Controls Leucine Metabolism and Insulin Secretion. KA Anderson, FK Huynh, K Fisher-Wellman, JD Stuart, BS Peterson, JD Douros, GR Wagner, JW Thompson, AS Madsen, MF Green, RM Sivley, OR Ilkayeva, RD Stevens, DS Backos, JA Capra, CA Olsen, JE Campbell, DM Muoio, PA Grimsrud, MD Hirschev. *Cell Metab.* (2017) 25(4):838-855
54. Progressive Mitochondrial Protein Lysine Acetylation and Heart Failure in a Model of Friedreich's Ataxia Cardiomyopathy. AR Stram, GR Wagner, BD Fogler, PM Pride, MD Hirschev, RM Payne. *PLoS One* (2017) 12(5):e0178354
55. Nicotinamide Mononucleotide Supplementation in a Model of Friedreich's Ataxia Cardiomyopathy Improves Cardiac Function and Bioenergetics in a SIRT3-Dependent Manner. AS Martin, DM Abraham, KA Hershberger, L Mao, H Cui, J Liu, X Liu, MJ Muehlbauer, JW Locasale, RM Payne, MD Hirschev. *JCI Insight* (2017) 2(14):93885
56. Loss of sirtuin 4 leads to elevated glucose- and leucine-stimulated insulin levels and accelerated age-induced insulin resistance in multiple murine genetic backgrounds. FK Huynh, X Hu, Z Lin, JD Johnson, MD Hirschev. *J. Inherited Metab. Dis.* (2018) 41(1):59-72
57. Chronic Ethanol Metabolism Inhibits Hepatic Mitochondrial Superoxide Dismutase via Lysine Acetylation. M Assiri, S Roy, P Harris, H Ali, Y Liang, C Shearn, D Orlicky, J Roede, MD Hirschev, DS Backos, KS Fritz. *Alcoholism: Clinical and Experimental Research* (2017) 41(10):1705-1714
58. Dietary Restriction and AMPK Increase Lifespan via Maintaining Balanced Mitochondrial Dynamics in *C. elegans*. HJ Weir, K Burkewitz, FK Huynh, R Laboy, MD Hirschev, WB Mair. *Cell Metabolism* (2017) 26(6):884-896
59. Mechanism-based Inhibitors of the Human Sirtuin 5 Deacylase: Structure–Activity Relationship, Biostructural, and Kinetic Insight. N Rajabi, M Auth, KR Troelsen, M Pannek, D Bhatt, M Fontenas, MD Hirschev, C Steegborn, AS Madsen, CA Olsen. *Angewandte Chemie* (2017) 56(47):14836-14841
60. Metabolic control by sirtuins and other enzymes that sense NAD⁺, NADH, or their ratio. KA Anderson*, AS Madsen*, CA Olsen, MD Hirschev. *BBA – Bioenergetics* (2017) 1858(12):991-998
61. daf-16/FoxO promotes gluconeogenesis and trehalose synthesis during starvation to support survival. JD Hibshman, AE Doan, BT Moore, REW Kaplan, A Hung, AK Webster, DP Bhatt, R Chitrakar, MD Hirschev, and LR Baugh. *eLife* (2017) 6:e30057
62. Sirtuin 5 is required for mouse survival in response to cardiac pressure overload. KA Hershberger, DM Abraham, AS Martin, L Mao, J Liu, H Gu, JW Locasale, and MD Hirschev. *J. Biol. Chem.* (2017) 292(48):19767-19781
63. Fructose and glucose regulate mammalian target of rapamycin complex 1 and can activate lipogenic gene expression via distinct pathways. Y Hu, I Semova, X Sun, H Kang, S Chahar, AN Hollenberg, D Masson, MD Hirschev, J Miao, SB Biddinger. *J. Biol. Chem.* (2018) 293(6):2006-2014
64. Reactive Acyl-CoA Species (RACS) modify proteins and induce carbon stress. AG Trub and MD Hirschev. *Trends in Biochem. Science* (2018) S0968-0004(18)30023-9
65. Ablation of Sirtuin5 in the postnatal mouse heart results in protein succinylation and normal survival in response to chronic pressure overload. KA Hershberger, DM Abraham, J Liu, JW Locasale, PA Grimsrud, and MD Hirschev. *J. Biol. Chem.* (2018) 293(27):10630-10645

66. Broad remodeling of the acetylproteome by SIRT3 manipulation fails to affect insulin secretion or beta-cell metabolism in the absence of dietary overnutrition. BS Peterson, JE Campbell, O Ilkayeva, PA Grimsrud, MD Hirschey, CB Newgard. *Cell Reports* (2018) 24(1):209-223
67. Sensing mitochondrial acetyl-CoA to tune respiration. CA Mills, AG Trub, MD Hirschey. *Trends in Endo. Metabolism* (2018) S1043-2760(18):30189-9
68. Quantifying competition among mitochondrial protein acylation events induced by ethanol metabolism. HR Ali, MA Assiri, PS Harris, C Michel, Y Yun, JO Marentette, FK Huynh, DJ Orlicky, CT Shearn, LM Saba, R Reisdorph, NA Reisdorph, MD Hirschey and KS Fritz. *J Proteome Res.* (2019) 18(4):1513-1531
69. Respiratory phenomics across multiple models of severe mitochondrial protein hyperacylation reveals a marginal impact on bioenergetics. KH Fisher-Wellman, PA Grimsrud, JA Draper, MT Davidson, AS Williams, TM Narowski, DH Slentz, OR Ilkayeva, RD Stevens, GR Wagner, R Najjar, MD Hirschey, JW Thompson, DP Olson, DP Kelly, TR Koves and DM Muoio. *Cell Reports* (2019) 26(6):1557-1572
70. Loss of BCAA Catabolism during Carcinogenesis Enhances mTORC1 Activity and Promotes Tumor Development and Progression. RE Ericksen, SL Lim, E McDonnell, WH Shuen, M Vadiveloo, PJ White, Z Ding, R Kwok, P Lee, GK Radda, CH Toh, MD Hirschey, W Han. *Cell Metabolism* (2019) 29(5):1151-1165
71. Cellular energetics and mitochondrial uncoupling in canine aging. JW Nicholatos, TM Robinette, SVP Tata, JD Yordy, AB Francisco, M Platov, TK Yeh, OR Ilkayeva, FK Huynh, M Dokukin, D Volkov, MA Weinstein, AR Boyko, RA Miller, I Sokolov, MD Hirschey, S Libert. *Geroscience* (2019) 41(2):229-242
72. SIRT6 Promotes Hepatic Beta-Oxidation via Activation of PPAR α . S Naiman, FK Huynh, G Reuven, Y Glick, Y Shahar, Y Kanfi, L Nahum, MY Avivi, A Gertler, T Doniger, G Zinman, O Yaron, B Lerrer, RA Harris, Z Bar-Joseph, D Gerber, MD Hirschey and HY Cohen. *Cell Reports* (2019) 29(12):4127-4143
73. Investigating RNA Expression Profiles Altered by Nicotinamide Mononucleotide Therapy in a Chronic Model of Alcoholic Liver Disease. MA Assiri, HR Ali, JO Marentette, Y Yun, J Liu, MD Hirschey, LM Saba, PS Harris, KS Fritz. *Human Genomics* (2019) 13(1):65
74. NRF2 activation promotes the recurrence of dormant tumour cells through regulation of redox and nucleotide metabolism. DB Fox, NMG Garcia, BJ McKinney, R Lupo, LC Noteware, R Newcomb, J Liu, JW Locasale, MD Hirschey, JV Alvarez. *Nature Metabolism* (2020) 2(4):318-334
75. Creating An Environment For A Distributed Scientific Workforce. MD Hirschey. *Nature* (2020) 582:184
76. Making data-driven hypotheses for gene functions by integrating dependency, expression, and literature data. MD Hirschey. *Biorxiv* (2020) <https://biorxiv.org/cgi/content/short/2020.07.17.208751v1>
77. Beta-cell specific ablation of sirtuin 4 does not affect nutrient-stimulated insulin secretion in mice. FK Huynh, BS Peterson, KA Anderson, Z Lin, A Coakley, F Llaguno, TT Nguyen, J Campbell, S Stephens, CB Newgard, and MD Hirschey. *AJP-Endocrinology and Metabolism* (2020) 319(4):E805-E813
78. SCF-Cyclin F targets the metabolic protein Sirtuin 5 for ubiquitination. CA Mills, X Wang, DP Bhatt, PA Grimsrud, JP Matson, D Lahiri, DJ Burke, JG Cook, MD Hirschey*, MJ Emanuele*. *Mol Cell Biol.* (2021) 41(2):e00269-20
79. Multiple metabolic changes mediate the resistance of *Caenorhabditis elegans* to complex I inhibitor rotenone. CP Gonzalez-Hunt, AL Luz, IT Ryde, EA Turner, OR Ilkayeva, DP Bhatt, MD Hirschey, JN Meyer. *Toxicology* (2021) 447:152630

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81. In Vivo Optical Metabolic Imaging of Long-Chain Fatty Acid Uptake in Orthotopic Models of Triple-Negative Breast Cancer. MC Madonna, JE Duer, JV Lee, J Williams, B Avsaroglu, C Zhu, R Deutsch, R Wang, BT Crouch, MD Hirschey, A Goga, N Ramanujam. *Cancers* (2021) 13(1):14
82. The Growing Landscape of Protein Modifications. EK Keenan, DK Zachman, and MD Hirschey. *Molecular Cell* (2021) 81(9):1868-1878
83. Early-life mitochondrial DNA damage results in lifelong deficits in energy production mediated by redox signaling in *Caenorhabditis elegans*. Hershberger KA, Rooney JP, Turner EA, Donoghue LJ, Bodhicharla R, Maurer LL, Ryde IT, Kim JJ, Joglekar R, Hibshman JD, Smith LL, Bhatt DP, Ilkayeva OR, Hirschey MD, Meyer JN. *Redox Biol.* (2021) 43:102000
84. Deglutarylation of GCDH by SIRT5 controls lysine metabolism in mice. DP Bhatt, CA Mills, KA Anderson, BJ Henriques, TG Lucas, S Francisco, J Liu, OR Ilkayeva, AE Adams, SR Kulkarni, DS Backos, PA Grimsrud, CM Gomes, MD Hirschey. *Journal of Biological Chemistry* (2022) 298(4):101723
85. Statin therapy inhibits fatty acid synthase via dynamic protein modifications. AG Trub, GR Wagner, KA Anderson, SB Crown, G-F Zhang, JW Thompson, OR Ilkayeva, RD Stevens, PA Grimsrud, RA Kulkarni, DS Backos, JL Meier, MD Hirschey. *Nature Comm.* (2022) 13(1):2542
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87. NAD metabolism modulates inflammation and mitochondria function in diabetic kidney disease. Myakala K, Wang XX, Shults NV, Krawczyk E, Jones BA, Yang X, Rosenberg AZ, Ginley B, Sarder P, Brodsky L, Jang Y, Na CH, Qi Y, Zhang X, Guha U, Wu C, Bansal S, Ma J, Cheema A, Albanese C, Hirschey MD, Yoshida T, Kopp JB, Panov J, Levi M. *J Biol Chem.* (2023) 299:104975
88. Optical imaging reveals chemotherapy-induced metabolic reprogramming of residual disease and recurrence. Sunassee ED, Deutsch RJ, D'Agostino VW, Castellano-Escuder P, Siebeneck EA, Ilkayeva O, Crouch BT, Madonna MC, Everitt J, Alvarez JV, Palmer GM, Hirschey MD, Ramanujam N. *Sci Adv.* (2024) 10:14
89. Cysteine S-acetylation is a post-translational modification involved in metabolic regulation. EK Keenan, A Bareja, Y Lam, PA Grimsrud, MD Hirschey. *Nature Metabolic Health & Disease* (2025) 3:43
90. Interpretable multi-omics integration with UMAP embeddings and density-based clustering. P Castellano-Escuder, DK Zachman, K Han, MD Hirschey. *Nature Comm.* (2025) 16(1):5771
91. Fatty acid desaturases link cell metabolism pathways to promote proliferation of Epstein-Barr virus-infected B cells. EN Bonglack, KK Hill, AP Barry, A Bartlett, P Castellano-Escuder, MD Hirschey, MA Luftig. *PLOS Pathogens* (2025) 21(5):e1012685
92. Pathway Coessentiality Mapping Reveals Complex II is Required for de novo Purine Biosynthesis in Acute Myeloid Leukemia. AE Stewart*, DK Zachman*, P Castellano-Escuder, LM Kelly, B Zolyomi, MDI Aiduk, CD Delaney, IC Lock, C Bosc, J Bradley, ST Killarney, JD Stuart, PA Grimsrud, OR Ilkayeva, CB Newgard, NS Chandel, A Puissant*, KC Wood*, and MD Hirschey*. *Nature Metabolism* (2025) 7:953-970

93. SIRT4 Controls Macrophage Function and Wound Healing through Control of Protein Itaconylation in Mice. KA Anderson, B deSouza, P Castellano-Escuder, Z Lin, OR Ilkayeva, MJ Muehlbauer, CB Newgard, PA Grimsrud, and MD Hirschev. *In Revision* (2025)
94. In Vivo Imaging of Metabolic Heterogeneity Across Three Endpoints Relevant to Aggressive Breast Cancer. VW D'Agostino, M Kwan, A Yong, K Grossman, ED Sunassee, MC Madonna, MD Hirschev, GM Palmer, and N Ramanujam. *PNAS Nexus* (2026) pgag027. doi: 10.1093/pnasnexus/pgag027
95. Targeting Androgen Receptor Signaling to Enhance Cancer Immunotherapy. DA Bader, B Chakroborty, DP McDonnell, MD Hirschev. *Trends in Pharmacological Sciences* (2025) In Press
96. Caenorhabditis elegans fed native gut microbiota have altered bioenergetic pathway utilization impacting mitochondrial function and susceptibility to pollutants. CM Bergemann, LE Jameson, IW Kenny-Ganzert, J Huayta, P Castellano-Escuder, A Sarkar, OR Ilkayeva, DR Sherwood, MD Hirschev, JN Meyer. *Accepted* (2025)
97. datadrivenhypothesis.org: A resource for metabolic gene discovery through integrated pathway co-essentiality mapping. MD Hirschev, P Castellano-Escuder, J Bradley. *bioRxiv* (2026) doi: 10.1101/2026.02.12.705287 *In Revision*

Books & Chapters

1. Methods in Molecular Biology: Sirtuins. Edited by MD Hirschev. *Springer, Methods and Protocols, Volume 1077* (2013)
2. Chapter 28: Sirtuins. FK Huynh, E McDonnell, KA Anderson, MD Hirschev. *Signaling Pathways in Liver Diseases, 3rd Edition* (2015). Edited by J-F Dufour & P-A Clavien
3. Chapter 5: Deacetylation by SIRT3 Relieves Inhibition of Mitochondrial Protein Function. P Chhoy, KA Anderson, KA Hershberger, FK Huynh, AS Martin, E McDonnell, BS Peterson, LA Starzenski, DS Backos, KS Fritz, and MD Hirschev. *Proteins and Cell Regulation, Volume 10: Sirtuins* (2016). Edited by Riekelt H. Houtkooper
4. Chapter 7: Reactive Acyl-CoA Species and Deacylation by the Mitochondrial Sirtuins. KA Hershberger and MD Hirschev. *Introductory Review on Sirtuins in Biology and Disease* (2017). Edited by LP Guarente, R Mostoslavsky, AG Kazantsev
5. Cysteine Acetylation. PA Grimsrud, EK Keenan, and MD Hirschev. *Methods in Molecular Biology. Submitted* (2025)

Patents

1. Composition and Methods for Determining Predisposition to Developing Metabolic Syndrome. International Patent Serial No. WO/2012/024189. E Verdin, MD Hirschev, B Aouizerat

EDITORIAL BOARDS

Journal	Year
Journals of Gerontology: Biological and Medical Sciences	2012 – Present
Molecular & Cellular Oncology (Landis)	2013 – Present
Molecular Metabolism	2013 – Present

AD HOC REVIEWER

Year	Articles Reviewed
2026	4
2025	16
2024	6
2023	10
2022	10
2021	10
2020	20
2019	27
2018	35
2017	37
2016	33
2015-earlier	125

Representative Journals: BBA – General Subjects; Cell (including Cell Chem Bio, Cell Metabolism, Cell Reports, Molecular Cell); Diabetes; eLife; EMBO; Free Radical Biology and Medicine; Hepatology; Journal of Clinical Investigation (JCI); Methods in Enzymology; Molecular Metabolism; Nature (including Nature Cell Biology, Nature Chemical Biology, Nature Metabolism, Nature Medicine, Nature Reviews); Obesity; Oncogene; PLoS One; Science (including Science Signaling); The Journal of Biological Chemistry (JBC); Trends in Molecular Medicine, Biochemical Sciences

SPEAKING

Event	Year
<i>ADSA AI Lunch & Learn Series, Alliance for Data Science & AI, Virtual</i>	2026
Annual Southeastern Fellows Research Skills Workshop, Duck, NC	2026
BCG × QS: Workforce, AI, and the Future of Skills, Washington, D.C.	2026
2025 Singapore Symposium on Brain-Body Interactions (SSBBI), Singapore	2025
Undergraduate Education x AI, Parent’s Association, Duke University	2025
OpenAI Discussion with Sarah Friar, Moderator, Duke University	2025
International Symposium for Organelle Medicine, Yonsei University, Korea	2025
Forever Learning Institute, “Computational Thinking & AI”, Virtual	2025
AI for University Leadership, Duke University	2025
UseR2025, Co-Organizer & Speaker, Duke University	2025
Triangle AI Summit, Duke University	2025
Annual Southeastern Fellows Research Skills Workshop, Duck, NC	2025
iSLS, National University of Singapore, Singapore	2025
2024 Singapore Symposium on Brain-Body Interactions (SSBBI), Singapore	2024
Duke-Duke/NUS AI Virtual Symposium	2024
Annual Southeastern Fellows Research Skills Workshop, Duck, NC	2024
AI Summit, Duke University	2024
10th Helmholtz Diabetes Conference, Munich, Germany	2023
Korean Society of Mitochondrial Research and Medicine, Korea	2023
20 th Annual Southeastern Fellows Research Skills Workshop, Duck, NC	2023
Duke-NUS Medical School, Singapore	2023
FASEB: The Protein Lipidation Conference, Saxtons River, Vermont	2022

Event	Year
American Diabetes Association 82 nd Annual Meeting, NOLA	2022
Massachusetts General Hospital Cancer Center, Boston, MA	2022
Cardiovascular & Metabolic Disease Program, Duke-NUS, Singapore	2022
Calvin College/Hope College, Michigan	2022
American Aging Association Annual Meeting, Madison, WI	2021
American Diabetes Association 81 st Annual Meeting	2021
McMaster University, Hamilton, ON, Canada	2021
Computational Biology & Bioinformatics, Duke University, Durham, NC	2021
Icahn School of Medicine at Mt. Sinai, New York, NY	2021
Pharmacology & Cancer Biology, Duke University, Durham, NC	2020
American Diabetes Association 80 th Annual Meeting	2020
MMIG seminar, University of Washington, Seattle, WA	2020
NHGRI Division of Intramural Research Seminar Series, NIH, Bethesda, MD	2019
ASTAR, Singapore	2019
American Diabetes Association 79 th Scientific Sessions, San Francisco, CA	2019
Touchstone Diabetes Center, UT-Southwestern, TX	2019
Boston University, Boston, MA	2019
The Rockefeller University, NY	2019
Keystone Mitochondria in Aging and Age-Related Disease, Keystone, CO	2019
Singapore Symposium on Metabolic Disease	2018
Janssen/Johnson & Johnson, Spring House, PA	2018
Diabetes Research Center, University of Pennsylvania, PA	2018
Mitochondrial Plasticity in Metabolism and Signalling, Cologne, Germany	2018
Frontiers in Metabolism, Morgridge Institute, Madison, WI	2018
Duke Epigenetics and Epigenomics Program (DEEP), Duke University	2018
Kern Lipid Conference, Vail, CO	2018
ASTAR & Duke-NUS, Singapore	2018
Oklahoma Medical Research Foundation, OK	2018
University of Utah, UT	2018
Singapore Symposium on Metabolic Disease	2017
CSHL Asia Mitochondria, Suzhou, China	2017
INFORM, Rio de Janeiro, Brazil	2017
Reversible Acetylation in Health & Disease, FASEB, Big Sky, MT	2017
Mechanisms of Metabolic Signaling, CSHL, NY	2017
UNC School of Pharmacy Institute for Drug Safety Sciences, Durham, NC	2017
The Mechanisms of Life, ASBMB, Chicago, IL (Session Chair, Co-Organizer)	2017
Frontiers in Stem Cells in Cancer Course, Atlanta, GA	2017
Keystone Mitochondria Communication, Taos, NM	2017
Diabetes & Obesity Talk Series, University of Iowa, IA	2016
Fusion Cancer Metabolism, Paphos, Cyprus	2016
UNSW, Sydney, Australia & ComBio, Brisbane, Australia	2016
Molecular Medicine Research Seminar, Children's Hospital of Pittsburgh, PA	2016
American Diabetes Association 76 th Scientific Sessions (Session Chair)	2016
INFORM, Boston, MA	2016
Endocrine Grand Rounds, Duke University, NC	2016
Nestle Institute of Health Sciences/EPFL, Lausanne, Switzerland	2015
Aging - A Herrenhausen symposium/Nature Medicine, Hannover, Germany	2015
Pharmacology & Cancer Biology, Duke University, Durham, NC	2015
Singapore Symposium on Metabolic Diseases, Singapore	2015

Event	Year
Glucose Transport: Gateway for Metabolic Systems Biology, Big Sky, MT	2015
Cardiac Retreat, Indiana University, Indianapolis, IN	2015
Keystone Nutrient Control of Lipid Metabolism, Copenhagen, Denmark	2015
Harvard School of Public Health, Boston, MA	2015
Keystone Biology of Sirtuins, Santa Fe, NM	2015
Annual Tennessee Physiological Society Meeting, Vanderbilt, TN (Keynote)	2015
Keystone Metabolism and Tumor Biology, Vancouver, BC (Session Chair)	2015
Division of Endocrinology Grand Rounds, Duke University, Durham, NC	2015
Biochemistry, Molecular Biology & Biophysics Seminar, Univ. of Minnesota	2014
Feinberg School of Medicine, Northwestern University, Chicago, IL	2014
Yale Liver Center, Yale University, New Haven, CT	2014
Molecular Genetics of Aging, Cold Springs Harbor, NY	2014
Helmholtz-Nature Medicine Diabetes Conference, Munich, Germany	2014
O'Brien Kidney Center Research Symposium, Duke University, Durham, NC	2014
U Penn/CHOP Liver Biology and Translational Therapeutics, Philadelphia, PA	2014
UMDF Mitochondrial Medicine Annual Meeting 2014, Pittsburgh, PA	2014
Interdisciplinary Symposium on Mitochondrial Dysfunction, Duke University	2014
PTMs in Epigenetics and Metabolism, University of Copenhagen, Denmark	2014
Chemical Biology Supergroup Meeting, Duke University, Durham, NC	2014
Biophysical Society Annual Meeting, San Francisco, CA (Co-chair)	2014
Biology of Aging, Duke University, Durham, NC	2013
Duke Cancer Institute Tumor Biology Retreat, Durham, NC	2013
Endocrinology Grand Rounds, Duke University Medical Center, Durham, NC	2013
Conference on Human Nutrition & Functional Medicine, Portland, OR	2013
Helmholtz-Nature Medicine Diabetes Conference, Munich, Germany	2013
PhD Graduate School of Metabolism and Endocrinology, S. Funen, Denmark	2013
Technical University of Denmark, Copenhagen, Denmark	2013
Metabolic Signaling and Disease, Cold Springs Harbor, NY	2013
The Halifax Project: Getting to Know Cancer, Halifax, Nova Scotia, Canada	2013
5th Singapore Symposium on Metabolic Diseases, Singapore (Session Chair)	2013
Duke-NUS Graduate Medical School, Singapore	2013
Cell Symposia Mitochondria: from Signaling to Disease, Lisbon, Portugal	2013
Mitochondria, Energetics, Epigenetics, Environment, & DNA Damage, RTP	2013
Integrative Cell Signaling & Neurobiology of Metabolism, Yale University, CT	2013
Basic Science Day, Duke University Medical Center, Durham, NC	2012
Integrative Biology of Exercise, Westminster, CO	2012
Mitochondria & Metabolism, Thomas Jefferson University, Philadelphia, PA	2012
72 nd Scientific Sessions American Diabetes Association, Philadelphia, PA	2012
Central Society for Clinical Research Combined Meeting, Chicago, IL	2012
National Institute of Environmental Health Sciences, RTP, NC	2012
Duke-NUS, National University of Singapore, Singapore	2012
Cancer Genetics and Genomics Forum, Duke University, Durham, NC	2012
UAB Nutrition Obesity Research Center, Birmingham, AL	2012
East Carolina Diabetes and Obesity Institute, Greenville, NC	2011
University of North Carolina – Chapel Hill, NC	2011
Pharmacology & Cancer Biology, Duke University, Durham, NC	2011
Keystone Symposium on Diabetes and Obesity, Keystone, CO	2011
Cardiovascular Research Institute, UCSF, Tomales Bay, CA	2010
Molecular Genetics of Aging, Cold Springs Harbor, NY (2006, 2008)	2010

Event	Year
Gordon Conference on the Biology of Aging, Les Diablerets, Switzerland	2010
Keystone Symposium on Diabetes, Whistler, BC, Canada	2010
Liver Center External Advisory Board Symposium, San Francisco, CA	2010
Gladstone Institute Scientific Advisory Board, San Francisco, CA	2010
FEBS Advanced Lecture Course on Mitochondria, Aussois, France	2009
Bohemian Grove, Monte Rio, CA	2009
Gordon Conference on Oxidative Stress & Disease, Barga, Italy	2009
American Chemical Society National Meeting, San Diego, CA	2005
Biomolecular Science & Engineering Session, Santa Barbara, CA	2004
Materials Research Outreach Symposium, Santa Barbara, CA (2003)	2004
Gordon Conference: Graduate Research Conference, Ventura, CA	2003
Center for Environmental Bio-Inorganic Chemistry, Princeton, NJ	2003

GRANTS & FUNDING

Current

OpenAI

Metascience

Role: PI

2025 – 2027

Nicholas School of the Environment, Duke

AI-assisted Mechanistic Toxicology Framework

Role: Co-PI (Meyer, Duke)

2025 – 2027

National Institutes of Health, NIDDK

5R01-DK131065-05

Novel mitochondrial protective properties of annexin A1

Role: Co-I (Privratsky, Duke)

2021 – 2026

National Institutes of Health, NIBIB

5R01-EB028148-06

Development of CapCell Scope for Metabolic Imaging of Tissue Heterogeneity and Therapy Response

Role: Co-I (Ramanujam, Duke)

2024 – 2028

United States Army Medical Research Acquisition Activity

HT94252411055

A single shot therapy will accelerate the elimination of breast cancer

Role: Co-I (Ramanujam, Duke)

2024 – 2028

Duke-NUS

Block Grant

Role: PI

2025 – 2028

Grant Reviewer (past 5 years)

Review Panel	Year
ASCO-YI Pre-review	2025
Pathophysiology of Obesity & Metabolic Disease (POMD) Study Section, NIH	2024
NSF-CAREER	2023
SPLENDOR-NC, UNC-Chapel Hill	2023
Khoo Fellowship, Duke-NUS, Singapore	2021 – Present
European Research Council (ERC)	2021
Sir Henry Wellcome Postdoctoral Fellowship	2021
SEP Study Section, NIH	2021
Duke CTSA TL1 Physician and Postdoctoral Training Programs	2019 – 2022
Danish Diabetes Academy Grant Review Committee	2018 – Present

Completed (Past 5 years)

National Institutes of Health, NIA

R21-AG08033401

Studies on the impact of acetyl-cysteine on metabolism

Role: PI

2022 – 2024

Duke Cancer Institute Pilot Grant

2023 – 2024

National Institutes of Health, NIA

R01-AG045351, 03S1, 03S5

Novel SIRT5 enzymatic activity regulates cellular mechanisms of aging and disease

Role: PI

2014 – 2024

National Institutes of Health, NEI

K08

Mentored Clinical Scientist Research Career Development Award

Role: Co-Mentor (Sidney Gospe, III, M.D., Ph.D., Duke University)

2018 – 2023

Duke Cancer Institute Pilot Grant

2022 – 2023

National Institutes of Health, NIDDK

1R01-DK115568, 03S2

Post-Translational and Epigenetic Control of Branched-Chain Amino Acid Metabolism

Role: PI

2018 – 2022

National Institutes of Health, NCI

R21-CA228342

Determining the sub-cellular organelles that link lipid signaling and epigenetics

Role: PI

2019 – 2021

National Institutes of Health, NIDDK

5R24DK085610-07

Reversible mitochondrial protein acetylation and metabolic regulation
 Role: Co-I (Eric Verdin, Buck Institute)
 2016 – 2021

The Glenn Foundation

Glenn Award for Research in Biological Mechanisms of Aging
 Role: PI
 2018 – 2020

TEACHING

Course ID	Course Name	Year
MCB820	Cancer Research from Concept to Translation	2026
MCB818	Molecular Mechanisms of Oncogenesis	2025
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2025
HSF	Medical Student Curriculum: Human Structure & Function	2025
MCB818	Molecular Mechanisms of Oncogenesis	2024
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2024
HSF	Medical Student Curriculum: Human Structure & Function	2024
UNIV103	Let's talk about: Digital You	2024
MCB818	Molecular Mechanisms of Oncogenesis	2023
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2023
HSF	Medical Student Curriculum: Human Structure & Function	2023
FriSCC	Frontiers in Stem Cells in Cancer Course	2023
FriARR	Frontiers in Aging and Regeneration Research Course	2023
FriAAR	Frontiers in Alzheimer's and Aging Research	2023
MCB818	Molecular Mechanisms of Oncogenesis	2022
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2022
HSF	Medical Student Curriculum: Human Structure & Function	2022
PCB710	Grant Writing	2022
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2021
HSF	Medical Student Curriculum: Human Structure & Function	2021
PCB710	Grant Writing	2021
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2020
HSF	Medical Student Curriculum: Human Structure & Function	2020
PCB710	Grant Writing	2020
–	Farnam Street School	2020
CMB710	TidyBiology: An Introduction to Biological Data Science in R	2019
HSF	Medical Student Curriculum: Human Structure & Function	2019
PCB710	Grant Writing	2019
PCB780	Advances in Cancer Research	2019
FriSCC	Frontiers in Stem Cells in Cancer Course	2019
FriARR	Frontiers in Aging and Regeneration Research Course	2019
PCB710	Grant Writing	2018
PCB780	Advances in Cancer Research	2018
FriSCC	Frontiers in Stem Cells in Cancer Course	2018
FriARR	Frontiers in Aging and Regeneration Research Course	2018
PCB710	Grant Writing	2017
CMB551	Regulation of Mitochondrial Metabolism by Post-translational Modifications	2017
FriSCC	Frontiers in Stem Cells in Cancer Course	2017

Course ID	Course Name	Year
FriARR	Frontiers in Aging and Regeneration Research Course	2017
CMB551	Regulation of Mitochondrial Metabolism by Post-translational Modifications	2016
FriSCC	Frontiers in Stem Cells in Cancer Course	2016
FriARR	Frontiers in Aging and Regeneration Research Course	2016
CMB551	Regulation of Mitochondrial Metabolism by Post-translational Modifications	2015
CMB551	Regulation of Mitochondrial Metabolism by Post-translational Modifications	2014
CMB551	Regulation of Mitochondrial Metabolism by Post-translational Modifications	2013
PCB680	Cardiovascular Molecular Biology	2013
TOX801	Department Seminar Series	2012
–	Medicine & Biochemistry Departments, UCSF	2010
–	Medicine & Biochemistry Departments, UCSF	2009
–	Chemistry and Biochemistry, UCSB	2004
–	Chemistry and Biochemistry, UCSB	2003
–	Chemistry and Biochemistry, UCSB	2002
–	College of Agriculture and Life Science, UVM	2001
–	American Red Cross: Health and Safety	1997 – 2006

MENTORING

Post-Doctoral Fellows

Name	Year
Michelle Green, Ph.D.; <i>T32 Cancer Biology Fellowship</i>	2012 – 2014
Frank Huynh, Ph.D.; <i>CDA-ADA Fellowship, NSERC Fellowship</i>	2012 – 2018
Gregory Wagner, Ph.D.; <i>T32 Endocrinology Fellowship</i>	2013 – 2016
Dhaval Bhatt, Ph.D.	2014 – 2018
Allie Mills, Ph.D.; <i>T32 DOCK Fellowship</i>	2018 – 2020
Jon Haldeman, Ph.D.	2019 – 2020
Derek Zachman, M.D., Ph.D., <i>R38/K38 Scholar</i>	2019 – Present
Russell Ericksen Ph.D., <i>ASTAR Scholar</i>	2019 – 2025
Pol Castellano-Escuder	2021 – 2024
David Bader, M.D., Ph.D., <i>F32 Fellowship</i>	2023 – Present

Doctoral Students

Name	Year
Eoin McDonnell	2012 – 2016
Kathleen Hershberger; <i>F31 NRSA Fellowship, Bass Fellowship</i>	2012 – 2017
Brett Peterson (co-mentor)	2012 – 2018
Angelical Martin; <i>F31 NRSA Diversity Fellowship</i>	2013 – 2017
Alec Trub; <i>F31 NRSA Fellowship</i>	2016 – 2021
E. Keith Keenan; <i>NIH Diversity Supplement</i>	2018 – 2024

Name	Year
Beverly deSouza	2020 – Present

Masters Students

Name	Year
Peter Chhoy	2011 – 2013
Miaraha Humayun	2019
Alexander Lawandi	2020 – 2024

Undergraduate Students

Name	Year
Laura Starzenski; <i>Gordon Fellowship</i>	2011 – 2012
Jasper Tseng; <i>Gordon Fellowship</i>	2015
Surya Veerabagu	2015 – 2016
Jihong Tang	2018
Alexander Adams	2018 – 2021
Shreyas Kulkarni	2018 – 2020
Raymond Chen	2018
Josh Farahzad	2019
Matthew Huang	2019 – 2022
Harsha Srijay	2019 – 2020
Franklin Wu	2020
Lucy Gu	2020
Prajwal Jagadish	2020
Sai Rachakonda	2020
Kiera Schwarz	2021
Srikar Kavirayuni	2021
Aseda Asomani	2021 – 2023
Srijan Oduru	2022 – Present
Imogen Rawlings-Green	2025 – Present

Pre-Doctoral Students

Name	Year
Peter Chhoy	2011
Jonathan Motley	2011
Kathleen Hershberger	2011
Angie Gaviglio	2012
Brett Peterson	2012
Eoin McDonnell	2012
Angelical Martin	2012
Jon Hibshman	2013
Alex Chamesian	2013
Brett Condon	2013

Name	Year
Marc Johnson	2014
Grace Beggs (NSF Graduate Research Fellowship)	2015
Doug Fox	2015
Alec Trub	2016
Annamarie Allen	2016
Wenxin Tong	2017
E. Keith Keenan	2018
Chi Wut “William” Wong	2018
Erick Maravilla	2019
Beverly deSouza	2020
Ben Neupert	2020
Carl Manning Jr.	2021
Caleb McIver	2022
Courtney Manning	2023
Emma Beane	2023
Kerry Dillon	2023
Yechan Moon	2024
Jake Hira	2024
Elizabeth Florida	2025

Prelim/Thesis Committees

Name	Year
Taylor Rosa (Newgard Lab)	2011
Edward Zhu (Yang Lab)	2012
Jonathan Haldeman (Newgard Lab)	2012
Meghan Woods (Yao Lab)	2012
Wenjing Xu (Andrews Lab)	2012
John Rooney (Meyer Lab)	2013
Matt Howe (Haystead Lab)	2013
Jon Hibshman (Baugh Lab)	2014
Anthony Luz (Meyer Lab)	2015
Will Spencer (Arshavsky Lab)	2015
Daniel Sinden (Pitt Lab)	2016
Sydney Sanderson (Locasale Lab)	2017
Alice Sun (Chi Lab)	2018
Doug Fox (Alvarez Lab)	2018
Shree Bose (Shen Lab)	2019
Emma Bonglack (Luftig Lab)	2020
Paige Burrell (Kastan Lab)	2021
Mandy Wang (Hanks Lab)	2021
Priyanka Gupta (Singh Lab, Duke-NUS)	2021
Katherine Morton (Meyer Lab)	2021
Riley Deutsch (Ramanujam Lab)	2022
Pei-Chen Wu (Holley Lab)	2023
Ashley Truong (Gupta Lab)	2023
Amy Stewart (Wood Lab)	2023

Name	Year
Enakshi Sunassee (Ramanujam Lab)	2023
Clara dos Santos (Silva Lab)	2023
Chloe Markey (Reker Lab)	2024

UNIVERSITY SERVICE

Activity	Year
Provost's Oversight Committee for the Duke Computing Initiative	2025 – Present
AI at Duke Steering Committee	2025 – Present
AI Solutions Advisory Council (AI-SAC)	2023 – Present
Information Technology Advisory Council (ITAC)	2023 – Present
State of AI Survey, Duke University	2024
Admissions Committee: Cell and Molecular Biology (CMB)	2012 – 2015, 2017
Responsible Conduct of Research Retreat Speaker	2012, 2013
Seminar Series Committee: Regulatory Networks in Health and Disease	2012 – 2015