NATIONAL ACADEMIES Sciences Engineering Medicine

Forum on Neuroscience and Nervous System Disorders
Board on Behavioral, Cognitive, and Sensory Sciences

Unraveling the Neurobiology of Empathy and Compassion: Implications for Treatments for Brain Disorders and Human Well-Being: A Workshop

May 19 & 21, 2025 | 11:00am–3:00pm ET | Virtual

ATTENDEE PACKET

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Unraveling the Neurobiology of Empathy and Compassion: Implications for Treatments for Brain Disorders and Human Well-Being

A Virtual Workshop

Monday, May 19, 2025: 11:00 am – 3:00 pm ET
Wednesday, May 21, 2025: 11:00 am – 3:00 pm ET

Objectives

- Consider the various definitions and measurements of empathy and compassion across fields.
- Examine evidence on the underlying neurobiological mechanisms of empathy and compassion, their evolutionary origin, and their role in brain functionality, including in cases of brain disorders.
- Explore how factors such as genetics, environment, social interactions, and psychological states influence the development and expression of empathy and compassion.
- Discuss how different treatments (e.g., behavioral and pharmacological) for brain disorders affect empathy and compassion.
- Consider how understanding the neurobiological mechanisms of empathy and compassion may be applied in other domains such as healthy workforce practices.

Program At-A-Glance

- **Day 1 (May 19)**
  - Welcome & Introductory Remarks
  - Workshop Overview
  - Keynote Presentation: The Importance of Empathy and Compassion
  - **Session 1:** Pre-Clinical Models Relevant to Empathy and Compassion
  - **Session 2:** Human Development of Empathy and Compassion Across the Lifespan
  - Concluding Remarks
- **Day 2 (May 21)**
  - Welcome & Day 1 Recap
  - **Session 3:** Brain Disorders Affected by Empathy and Compassion and Potential Therapeutic Treatments
  - **Session 4:** Real-World Impacts of Empathy & Compassion
  - **Session 5:** Workshop Reflections & Future Opportunities
  - Concluding Remarks

MONDAY, MAY 19, 2025

11:00am **Introductory Remarks**

Frances Jensen, University of Pennsylvania, *Forum on Neuroscience and Nervous System Disorders Co-chair*

Deanna Barch, Washington University in St. Louis, *Forum on Neuroscience and Nervous System Disorders Co-chair*

11:05am **Workshop Overview**

Walter Koroshetz, National Institute of Neurological Disorders and Stroke, *Workshop Co-chair*

Gentry N. Patrick, University of California San Diego, *Workshop Co-chair*

11:10am **Keynote Presentation: The Importance of Empathy and Compassion**

Claus Lamm, University of Vienna

11:30am **Keynote Presentation: Moderated Panel and Audience Q&A**

Moderator: Richard Davidson, University of Wisconsin-Madison & Center for Healthy Minds, *Planning Committee Member*

11:40am **Session 1: Pre-Clinical Models Relevant to Empathy and Compassion**

Objective:

- Examine recent discoveries in pre-clinical models that elucidate the biological underpinnings of empathy/compassion like behaviors across species.
- Highlight common mechanisms that are conserved between and across animal models and humans.
- Discuss what is known about the evolutionary significance of empathy/compassion-like behaviors.
- Discuss the limitations and opportunities of utilizing pre-clinical models to study empathy and compassion.

11:40am **Session Overview**

Andrew Breeden, National Institute of Mental Health, *Planning Committee Member*

11:45pm **Speaker Presentations**

Monique Smith, University of California San Diego

Weizhe Hong, University of California Los Angeles

Steve Chang, Yale University

Valeria Gazzola, Netherlands Institute for Neuroscience

12:25pm **Moderated Panel and Audience Q&A**

1:05pm **BREAK**

1:15pm **Session 2: Human Development of Empathy and Compassion Across the Lifespan**

Objectives:

- Examine which developmental periods and factors (e.g., genetic, environmental) may be important for childhood and adulthood development of empathy and compassion.
- Discuss which brain areas are critical for empathy and compassion and how these regions change across developmental periods.
- Explore how social interactions (e.g., with parents, friends, schoolmates) and social context (e.g., war, severe depravation, and cults) can affect the development of empathy and compassion.

1:15pm **Session Overview**

Jessica Stern, Pomona College, *Planning Committee Member*

1:20pm **Keynote Lecture: Empathy and Compassion Across the Lifespan**

Felix Warneken, University of Michigan

1:40pm **Speaker Presentations**

Tobias Grossmann, University of Virginia

Ruth Feldman, Reichman University

Zach Gottlieb, Talk with Zach

Patricia Lockwood, University of Birmingham

2:20pm **Moderated Panel and Audience Q&A**

2:50pm **Day 1 Concluding Remarks**

Walter Koroshetz, National Institute of Neurological Disorders and Stroke, *Workshop Co-chair*

Gentry N. Patrick, University of California San Diego, *Workshop Co-chair*

3:00pm **Adjourn Day 1**

WEDNESDAY, MAY 21, 2025

11:00am **Review of Day 1 and Preview of Day 2**

Walter Koroshetz, National Institute of Neurological Disorders and Stroke, *Workshop Co-chair*

Gentry N. Patrick, University of California San Diego, *Workshop Co-chair*

11:05am **Session 3: Brain Disorders Affected by Empathy and Compassion and Potential Therapeutic Treatments**

Objectives:

- Examine how empathy and compassion may be impacted in various psychiatric, neurological, and neurodevelopmental disorders.
- Highlight case studies of potential therapeutic treatments (e.g., behavioral and pharmacological) for brain disorders affected by empathy and compassion.

11:05am **Session Overview**

Abigail Marsh, Georgetown University

11:10am **Speaker Presentations**

Damian Milton, University of Kent

Dimana Atanassova, Radboud Universiteit

Rebecca Waller, University of Pennsylvania

Patric Gagne, PsychopathyIs

Dan Karlin, MindMed

11:50pm **Moderated Panel and Audience Q&A**

12:30pm **BREAK**

12:45pm **Session 4: Real-World Impacts of Empathy & Compassion**

Objectives:

- Explore strategies and practices that can cultivate empathy and compassion.
- Discuss the impact of technology on the development of empathy and compassion.
- Examine the benefits of increased empathy and compassion for mental health, workforce satisfaction, healthcare delivery, and for society.

12:45pm **Session Overview**

Dawn Lavell Harvard, Trent University & Roots of Empathy, *Planning Committee Member*

12:50pm **Speaker Presentations**

Mary Gordon, Roots of Empathy

Sonja Raaum, University of Utah

Tor Wager, Dartmouth College

Kelli Marshall, Trent University

1:30pm **Moderated Panel and Audience Q&A**

2:10pm **Session 5: Workshop Reflections & Future Opportunities**

Objectives:

- Reflect on the themes shared across the workshop about the mechanisms of empathy and compassion.
- Discuss current barriers and opportunities for the field to move forward (e.g., cutting edge tools and technologies).

2:10pm **Session Overview**

Walter Koroshetz, National Institute of Neurological Disorders and Stroke, *Workshop Co-chair*

Gentry N. Patrick, University of California San Diego, *Workshop Co-chair*

2:15pm **Themes & Future Opportunities Discussion**

Paurvi Bhatt, The Rosalynn Carter Institute for Caregivers

Nomisha Kurian, University of Warwick

William Mobley, University of California San Diego, *Planning Committee Member*

2:55pm **Concluding Remarks**

Walter Koroshetz, National Institute of Neurological Disorders and Stroke, *Workshop Co-chair*

Gentry N. Patrick, University of California San Diego, *Workshop Co-chair*

3:00pm **Adjourn Day 2**

This event was planned by the following experts: Walter Koroshetz, National Institute on Neurological Disorders and Stroke; Gentry N. Patrick, University of California San Diego; Andrew Breeden, National Institute of Mental Health; Richard Davidson, University of Wisconsin-Madison; Dawn Lavell-Harvard, Trent University; Robert Malenka, Stanford University; Abigail Marsh, Georgetown University; William Mobley, University of California San Diego; Jessica Stern, Pomona College.

Note: The planning committee's role is limited to organizing the event. A proceedings based on the event will be prepared by an independent rapporteur.

Forum on Neuroscience and Nervous System Disorders

The Forum on Neuroscience and Nervous System Disorders was established in 2006 to provide a venue for building partnerships, addressing challenges, and highlighting emerging issues related to brain disorders, which are common, major causes of premature mortality, and, in aggregate, the largest cause of disability worldwide. The Forum's meetings bring together leaders from government, industry, academia, disease advocacy organizations, philanthropic foundations, and other interested parties to examine significant—and sometimes contentious—issues concerning scientific opportunities, priority setting, and policies related to research on neuroscience and brain disorders; the development, regulation, and use of interventions for the nervous system; and related ethical, legal, and social implications.

Forum members meet several times a year to exchange information, ideas, and differing perspectives. The Forum also sponsors workshops (symposia), workshop proceedings, and commissioned papers as additional mechanisms for informing its membership, other stakeholders, and the public about emerging issues and matters deserving scrutiny. Additional information is available at www.nas.edu/NeuroForum.

MEMBERS

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Upcoming Events

Unraveling the Neurobiology of Empathy and Compassion: Implications for Treatments for Brain Disorders and Other Applications (May 19 & 21, 2025)

Understanding Brain-Body Interactions to Advance Brain Health (Oct. 22, 2025)

Recent Events

Applying Neurobiological Insights on Stress to Foster Resilience Across the Lifespan (2025) *A collaboration with the Forum on Mental Health and Substance Use Disorders*

Approaches to Address Unmet Research Needs in Traumatic Brain Injury Among Older Adults (2024) *A collaboration with the Forum on Traumatic Brain Injury*

Examining Glucagon-Like Peptide-1 (GLP-1R) Agonists for Central Nervous System Disorders (2024)

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The **Board on Behavioral, Cognitive, and Sensory Sciences**, established in 1997, provides vision on how to advance public policy and practice by leveraging cutting-edge research in behavioral, cognitive, and sensory sciences.

Since its inception, the Board and the ad hoc study committees operating under its oversight have issued dozens of reports on such topics as how people learn, the aging mind, educating children with autism, visual impairment, hearing loss, the polygraph and lie detection, military recruitment, staffing standards for aviation safety inspectors, human behavior in military contexts, behavioral modeling and simulation, field evaluation, intelligence and counterintelligence, and threatening communications and behavior.
https://www.nationalacademies.org/bbcss/board-on-behavioral-cognitive-and-sensory-sciences

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Biosketches of Speakers

Dimana Atanassova, Ph.D.

Dimana Atanassova, Ph.D., is a postdoctoral researcher specializing in the cognitive and affective neuroscience of decision-making, learning and empathy. Her work explores how individuals learn to understand and respond to the emotions of others, with a particular focus on the effects of early life experiences and psychopathic traits.

Currently based at the Donders Institute for Brain Cognition and Behaviour at Radboud Universiteit in the Netherlands, Dimana integrates behavioural experiments with computational modeling and neurophysiological approaches to investigate learning across development. She is especially interested in how early experiences with unpredictability shape learning and social cognition.

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Paurvi Bhatt, M.P.H.

Paurvi Bhatt, M.P.H., is a healthcare executive, trusted strategist, and global thought leader with a reputation for marshaling funds, achieving focused outcomes, and leading innovative partnership strategies that bring health, care and bereavement solutions closer to home for aging populations, their families, and caregivers. As Chief Executive Officer (Interim) of The Rosalynn Carter Institute for Caregivers, and as Founder and CEO of ThirdEyeFocus, Ms. Bhatt leverages her executive experiences at Abbott, Levi Strauss, Medtronic, CARE, United States Agency for International Development (USAID), and U.S. Government Accountability Office (USGAO), in influencing, advising, and collaborating with founders, C-suite leaders and boards to modernize legacies, reframe referral and value pathways, and build organizational cultures that meet the social issues of our time.

Working across public, nonprofit, and commercial sectors of healthcare, Ms. Bhatt has a consistent record of impact working across industries and functions by aligning and distributing capital with partners that increase workforce support and expand access to home and community-based health and social services and workforce support for the elderly and immigrants worldwide. Ms. Bhatt is highly skilled in strategic philanthropic and capital investments, corporate responsibility/ESG, public affairs, and human resources benefits and employee engagement for purpose driven Fortune 500 companies, private start-ups, nonprofits, foundations, and government. She has extensive executive leadership as board chair, vice chair, and treasurer of global healthcare, caregiving, women's leadership, and immigrant focused private companies and nonprofit organizations.

Ms. Bhatt is an authentic, second-generation Indian American, Asian woman leader and recognized for her thought leadership across HIV/AIDS, women's health, and social impact. She is a dedicated mentor focused on developing leadership and talent to deliver outcome focused strategies across various functions and sectors.

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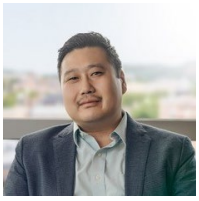
Steve Chang, Ph.D.



Steve Chang, Ph.D., is an Associate Professor of Psychology and of Neuroscience at Yale University. He is a member of the Wu Tsai Institute and the Kavli Institute for Neuroscience at Yale. He also directs Yale's undergraduate Neuroscience major. The primary goal of his research program is to elucidate the neural mechanisms underlying social interaction in nonhuman primates (rhesus macaques and common marmosets) and to inform how such mechanisms may go awry in disorders marked by social dysfunction. His laboratory applies multi-channel electrophysiological recordings of spikes and local field potentials from multiple brain regions to understand the neural codes, computations, and network-level interactions underlying naturalistic social cognition. Taking a multi-pronged and multi-species approach, his research aims to provide novel insights into the neural mechanisms underlying complex social cognition and, in the long run, inform our understanding of atypical social behaviors found in psychiatric conditions.

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Ruth Feldman, Ph.D.

Ruth Feldman, Ph.D., is the Simms-Mann Professor and Director of the Center of Developmental, Social, and Relationship Neuroscience at Reichman University, Israel, where she directs the Irving B. Harris public clinic for young children and their families, and holds adjunct professor positions at Yale University Child Study Center and University College London. Her empirical research and theoretical models focus on the neurobiology of human attachments, processes of biobehavioral synchrony, the biology of resilience. Her studies on the role of oxytocin, the parental brain, inter-brain synchrony, and the neuroscience of empathy have been instrumental in describing the biological basis of human social collaboration and widely published in the media. In several birth-to-adulthood studies she mapped the long-term effects of premature birth, maternal depression, and chronic trauma on brain and behavior and described the long-term effects of touch-based interventions on the adult brain. Her observational tools for analyzing social interactions are used in 34 countries and her dialogue-enhancing intervention for Israeli and Palestinian youth is the first to show long-term effects on brain and behavior in the context of intractable inter-group conflict. Dr. Feldman was named a highly-cited researcher (2018), World Expert in parenting research (2019), and Leader in Psychology (2024). She is the recipient of the 2018 Graven's Award for research on high-risk infants, the 2022 award of the Society of Reproductive and Infant Psychology, and the 2020 EMET prize, Israel's highest prize in the arts and sciences.

Patric Gagne, Ph.D.

Patric Gagne, Ph.D., is a writer, former therapist, and advocate for people suffering from sociopathic, psychopathic, and anti-social personality disorders. She is the author of the New York Times bestseller, Sociopath: A Memoir, which shares her struggle to understand her own sociopathy and shed light on this often-maligned and misunderstood mental disorder. Her dissertation — “Followers of Fagin: Secondary Sociopathy and Its Relationship to Anxiety” — explored the relationship between

sociopathy and anxiety and became the foundation for her memoir. Today, she is working to reduce the stigma attached to psychopathy and expand the diagnosis to include its status as a spectrum disorder.

Valeria Gazzola, Ph.D.

Valeria Gazzola, Ph.D., is an associate professor at the University of Amsterdam, where she leads the Mechanisms of Social Behavior group, and co-leads the Social Brain Lab at the Netherlands Institute for Neuroscience. She first studied biology in Parma and started her scientific career in Dr. Rizzolatti's lab, where the mirror neuron was first discovered. She then moved to the Netherlands where her research established that somatosensory cortices play a critical role in social cognition, extending her work from action-related mirror responses to the domain of sensation and emotions. Dr. Gazzola's lab investigates the causal relationship between mirror like activity and pro- and anti- social decisions and behavior by using a combination of imaging and stimulation techniques across rodents and humans. Her research is financed by Netherlands Organisation for Scientific Research (NWO) (VENI, VIDI), collaborative Dutch gravity grants (GUTs & DBI2) and European (ERCstG) grant.

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Mary Gordon

Mary Gordon is the Founder and President of Roots of Empathy. She is recognized internationally as an award-winning social entrepreneur, educator, best-selling author, child advocate and parenting expert who has created programs informed by the power of empathy. In 1981, Ms. Gordon founded Canada's first and largest Parenting and Family Literacy Centers, for which she received the Order of Canada. In 1996, she created the Roots of Empathy program, after which she named her international children's charity which now offers programs on three continents and in seven languages. In 2005, she created Seeds of Empathy for 3 to 5-year-old children in childcare which is offered in Canada, the U.S., and U.K. Mary Gordon and Roots of Empathy have been quoted in over 1,369 academic journals, and Ms. Gordon has been featured in the New York Times, the LA Times, the Washington Post, The Globe and Mail, Toronto Star, National Post, Time Magazine, The Guardian, The Irish Times, The Financial Times, The Independent and the Huffington Post, Japan's NHK, BBC, CBC, and in features on PBS, CNN, and NBC.

Ms. Gordon speaks and consults to governments, educational organizations, and public institutions, including the WHO, the UN and UNICEF. She is often a keynote presenter and panelist, discussing the role of empathy and social entrepreneurship at international conferences such as UBS Global Philanthropy Forum in Germany, and Digital-Living-Design (DLD) in Munich. In the U.S., she presented at The National Academies of Sciences, Engineering, and Medicine (NASEM), Division of Behavioral and Social Sciences and Education – Forum for Children's Well-Being with U.S. Surgeon General Dr. Vivek Murthy in Washington DC. She has been a contributor in education to the Sustainable Development Goals and the C20.

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Zach Gottlieb

Zach Gottlieb is a mental health activist, speaker, and the founder of Talk With Zach, a community and platform that aims to change the culture around wellness for the next generation. He is Head of Partnerships at Crew Dog, a lifestyle collegiate apparel brand, and consults for startups. He attends Stanford University, has spoken in many media forums, and has been published in the LA Times, New York Times, Boston Globe and more.

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Tobias Grossman, Ph.D.

Tobias Grossmann, Ph.D., is a Professor of Psychology at the University of Virginia where he directs the UVA Babylab. His research focuses on the early development of the social, cognitive and brain processes that underpin adaptive social communication and behavior. He earned his Ph.D. in Psychology from the Max Planck Institutes for Human Cognitive and Brain Sciences and Evolutionary Anthropology in Leipzig, Germany. He was then awarded a Sir Henry Welcome Fellowship at the Center for Brain and Cognitive Development at Birkbeck, University of London, UK. Before joining UVA, he led an independent research group at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig and received his Habilitation from Heidelberg University's Institute of Psychology.

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Weizhe Hong, Ph.D.

Weizhe Hong, Ph.D., is a Professor of Neurobiology, Biological Chemistry, and Bioengineering at the University of California Los Angeles. After earning his Ph.D. degree in 2012 from Stanford University and completing his postdoctoral training at California Institute of Technology, Dr. Hong started his lab at UCLA as an Assistant Professor in 2016. He was promoted to Associate Professor with tenure in 2020 and to Full Professor in 2023.

Dr. Hong aims to uncover the fundamental neural mechanisms underlying social behavior, with a specific focus on empathy and prosociality. While it is evolutionarily advantageous for individuals to act in ways that promote their own survival and reproductive success, humans and other animals frequently display empathy and compassion through behaviors that benefit others. Dr. Hong's research explores various forms of empathic and prosocial behaviors and investigates the neural mechanisms underlying these behaviors. Specifically, his lab establishes behavioral paradigms in mice to study prosocial comforting and helping behaviors. By integrating these paradigms with genetic, circuit-based, and computational methodologies, he reveals distinct neural pathways within the amygdala and prefrontal cortex that specifically encode and regulate these prosocial behaviors. Additionally, his research

extends beyond mechanisms within a single brain, aiming to understand how inter-brain neural dynamics emerge through social interactions between individuals.

Dr. Hong's work has been recognized by many honors and awards, including a Young Investigator Award from the Society for Neuroscience, an Early Career Award from the Society for Social Neuroscience, a Mallinckrodt Scholar Award, a Vallee Scholar Award, a Searle Scholar Award, a Packard Fellowship in Science and Engineering, a McKnight Scholar Award, a Klingenstein-Simons Fellowship, and a Sloan Research Fellowship.

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Dan Karlin, M.D.

Dan Karlin, M.D., joined MindMed as Chief Medical Officer in February 2021 following MindMed's acquisition of HealthMode, the company he co-founded and led as CEO.

Prior to HealthMode, he built and led clinical, informatics, and regulatory strategy for Pfizer's Digital Medicine and Innovation Research Lab. He also served as Global Clinical Lead for psychiatry clinical compounds at Pfizer. He previously served as founder and Chief Medical Officer at Column Health, a leading technology-enabled psychiatry and addiction practice. Dr. Karlin is a strategic advisor to several pharmaceutical, biotech, and health technology companies. He is also a founding Advisor to the Digital Biomarkers Journal, co-founder and Board Chair of the Digital Medicine Society (DiMe), and was on the committee for Leadership for Digital Drug Development Tools at Critical Path Alzheimer's Disease, Michael J. Fox Foundation for Parkinson’s Disease, and Mental Health IT at the APA.

Dr. Karlin is Board Certified in Psychiatry, Addiction Medicine, and Clinical Informatics. He is a Fellow of the APA and the American Society of Addiction Medicine and an Assistant Professor of Psychiatry at Tufts University School of Medicine. He graduated with degrees in Neuroscience and Behavior (BA), and Clinical Informatics (MA), Columbia University; Medicine (MD), University of Colorado School of Medicine.

Nomisha Kurian, Ph.D.

Nomisha Kurian, Ph.D., holds a PhD in Education from the University of Cambridge and is currently an Assistant Professor at the University of Warwick, focusing on empathetic AI and child-safe design in large language models.

Her recent publication on child-safe AI, flagging what she conceptualized as an "empathy gap" in AI, achieved 95 pieces of media coverage, including global outlets such as SkyNews, ABC News, and the Times of India, leading Taylor and Frances to recognize the article as achieving "the sixth highest impact score of all articles published in the journal ever"(Journal of Learning, Media and Technology). Dr. Kurian has substantial experience in impact-focused research, having won both the University of Cambridge Vice-Chancellor's Award for Social Impact and the University of Cambridge Applied Research Award.

You can read a recent research paper from Dr. Kurian here:

Kurian, N. (2024). 'No, Alexa, no!': designing child-safe AI and protecting children from the risks of the 'empathy gap'in large language models. Learning, Media and Technology, 1-14. https://www.tandfonline.com/doi/full/10.1080/17439884.2024.2367052

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Claus Lamm, Ph.D.

Claus Lamm, Ph.D., is the Professor of Biological Psychology at the Faculty of Psychology of the University of Vienna, with a specialization in Social, Cognitive and Affective Neuroscience. He has spent several formative years abroad, and founded the SCAN-Unit when he moved back to Vienna in 2010. The goal of his research group is to foster a thriving interdisciplinary research environment that will lead to innovative and cutting-edge research in the domain of Social Cognitive Neuroscience. He has made seminal contributions in investigating the neural bases of empathy and prosocial behavior, and pursues ever-more complex research approaches to unravel these multifaceted phenomena. This includes multi-modal investigations combining neuroimaging with psychopharmacology and psychoneuroendocrinology, as well as comparative approaches to test empathy and its precursors in ravens and dogs. More recently, he has also established a new research line on questions related to environmental social neuroscience and decision making. Besides his affiliation to the Faculty of Psychology, he is a member of the Environment & Climate Change Hub, the Vienna Cognitive Science Hub, and the Sustainability Advisory Board of the University of Vienna. He is also a member of the Austrian Academy of Sciences and has received two major recognition for his mentoring (APS Mentor Award, publication by his mentees https://tinyurl.com/nurneuro).

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Patricia Lockwood, Ph.D.

Patricia Lockwood, Ph.D., is a Professor of Decision Neuroscience, Sir Henry Dale Fellow and Jacobs Foundation Research Fellow at the University of Birmingham. She was previously a Junior Research Fellow at Christ Church and Somerville College, University of Oxford, and a Medical Research Council Fellow at the University of Birmingham, University of Oxford and University of Zurich. She holds a Ph.D in Psychology from University College London and a BSc in Psychology and Philosophy from the University of Bristol.

Her lab investigates social learning and decision-making across the lifespan and in neurological and psychiatric disorders using a mixture of computational modelling, behavioural measures, self-reporting, patient studies and neuroimaging. Dr. Lockwood combines frameworks from psychology, economics, ecology and decision neuroscience to capture how, when, and why people learn and make choices that have consequences for themselves and other people. Her recent interests include drawing on big data samples from diverse countries to go beyond using WEIRD samples in Neuroeconomics research. She holds multiple nationalities (British, Portuguese, Brazilian), she is a Fellow of the Association for Psychological Science and a member of the Women of the Future Network. You can read more about the lab here: www.sdn-lab.org. You can read her blog "The Helpful Brain" at Psychology

Today here: www.tinyurl.com/Helpful-Brain.

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Kelli Marshall

Kelli Marshall is an Anishinabe kwe from the Michi Saagiig Territory of Hiawatha First Nation. She sits with the Pike Clan. Ms. Marshall is the Indigenous Enrollment Advisor for The First Peoples House of Learning at Trent University.

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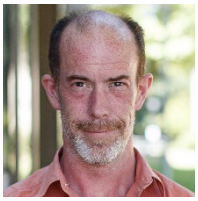
Damian Milton, Ph.D.



Damian Milton, Ph.D., is a Senior Lecturer in Intellectual and Developmental Disabilities at the University of Kent. Dr. Milton has been a consultant for the Transform Autism Education (TAE) project and numerous projects for the Autism Education Trust (AET). His interest in autism began when his son was diagnosed in 2005 as autistic at the age of two. Dr. Milton was also diagnosed with Asperger's in 2009 at the age of thirty-six. His primary focus is on increasing the meaningful participation of autistic people and people with learning disabilities in the research process and chairs the Participatory Autism Research Collective (PARC).

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Sonja Raaum, M.D.

Sonja Raaum, M.D., is an Associate Professor in the division of General Internal Medicine in the Department of Internal Medicine at the University of Utah. She earned her undergraduate and medical degrees from the University of Wisconsin – Madison and completed her internal medicine residency at the University of Utah. After joining faculty, she was an Associate Program Director in the Internal Medicine Residency Program. Dr. Raaum also serves as Course Director for an advanced medicine course, designed to instill fourth-year medical students with skills essential across all specialties.

Previously a hospitalist from 2015 to 2023, she now practices primary care and is the inaugural director of a primary care clinic that integrates medical and interprofessional students to provide compassionate, high-quality care to a diverse patient population. In 2022, Dr. Raaum completed Stanford University's Applied Compassion Training, through which she transitioned her educational focus to share these skills and structure with more individuals. As a medical educator, she is committed to training competent and compassionate healthcare professionals.

Monique Smith, Ph.D.

Monique Smith, Ph.D., is a T. Denny Sanford Institute for Empathy and Compassion Professor and an Assistant Professor at the University of California San Diego in the Departments of Neurobiology and Neurosciences.

Dr. Smith is a first-generation college student and received both her B.A. and M.A in Psychology from California State University San Marcos, under the mentorship of Dr. Keith Trujillo. She worked with Drs. Chris Evans and Amynah Pradhan at UCLA, where she developed her passion for understanding chronic pain. Dr. Smith received her Ph.D. in Behavioral Neuroscience from Oregon Health & Science University with Drs. Ryabinin and Heinricher. It was during her graduate studies that she serendipitously discovered the social transfer of pain, and embarked upon a journey to study the neural mechanisms of empathy. Finally, she conducted her postdoctoral training at Stanford University with Dr. Robert Malenka, where she used cutting-edge neurotechnologies to investigate the social transfer of pain and analgesia.

Dr. Smith is a world-recognized expert in the study of the neurobiology of empathy. Broadly, the Smith lab studies how social experiences alter sensory, internal and motivational states.

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Tor Wager, Ph.D.

Tor Wager, Ph.D., is the Diana L. Taylor Distinguished Professor in Neuroscience at Dartmouth College, and the Director of Dartmouth's Cognitive and Affective Neuroscience laboratory, the Dartmouth Brain Imaging Center, and the Dartmouth Center for Cognitive Neuroscience. Dr. Wager's research centers on the neurophysiology of affective processes—pain, emotion, stress, and empathy—and how they are shaped by cognitive and social influences. One focus area is the impact of thoughts and beliefs on learning, brain function, and brain-body communication. Another focus is the development of brain biomarkers that track and predict affective experience, including pain and other clinical symptoms. A third focus is on statistical, machine learning, and computational techniques that provide a foundation for new models of the affective brain. Dr. Wager's laboratory conducts basic research in these focus areas and applies the resulting techniques and models to collaborative, translational research on clinical disorders and interventions. In support of these goals, Dr. Wager and his group have developed several publicly available software toolboxes (see http://canlab.github.io). He also teaches courses and workshops on fMRI analysis and has co-authored a book, Principles of fMRI. More information about Dr. Wager and his lab's activities, publications, and software can be found at http://canlab.science.

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Rebecca Waller, Ph.D.

Rebecca Waller, Ph.D., is an associate professor at the University of Pennsylvania. Dr. Waller studies socioemotional development, child psychopathology, and personality development. In particular, her research examines the environmental contexts that children grow up in and that give rise to the development of antisocial behavior, including aggression, violence, theft, and problematic alcohol and substance use, as well as related constructs, such as callous- unemotional traits, fearlessness, empathy, and conscience. Dr. Waller's research explores how the environment interacts with genetic risk (i.e., using candidate genes, twin studies, adoption designs) to influence children's socioemotional development by shaping brain structure and function (i.e., using fMRI, DTI). Her work has a strong translational goal by focusing on understanding resilience among children and families to help inform prevention and intervention strategies for reducing antisocial behavior.

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Felix Warneken, Ph.D.

Felix Warneken, Ph.D., is Professor of Psychology at the University of Michigan, Ann Arbor and Director of the Social Minds Lab. He investigates the origins of cooperation and morality, combining developmental, cross-cultural, and comparative methods. He has received awards from the National Science Foundation, the Society for Research in Child Development, the Association for Psychological Science and the American Psychological Association. Dr. Warneken was selected as a Fellow of the Radcliffe Center for Advanced Study, a Fellow of the Association for Psychological Science, Senior Fellow at the Society of Fellows at Michigan, and a Kavli Fellow of the National Academy of Sciences.

Relevant research papers by Dr. Warneken:

- Warneken, Felix. "How children solve the two challenges of cooperation." Annual Review of Psychology 69, no. 1 (2018): 205-229.
- Warneken, Felix. "Insights into the biological foundation of human altruistic sentiments." *Current Opinion in Psychology* 7 (2016): 51-56.
- Warneken, Felix, and Michael Tomasello. "Altruistic helping in human infants and young chimpanzees." *science* 311, no. 5765 (2006): 1301-1303.

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Biosketches of Planning Committee Members

Walter Koroshetz, M.D.

Planning Committee Co-Chair

Walter Koroshetz, M.D., was selected Director of the National Institute of Neurological Disorders and Stroke (NINDS) on June 11, 2015. Dr. Koroshetz joined NINDS in 2007 as Deputy Director, and he served as Acting Director from October 2014 through June 2015. Previously, he served as Deputy Director of NINDS under Dr. Story Landis. Together, they directed program planning and budgeting, and oversaw the scientific and administrative functions of the Institute. He has held leadership roles in a number of NIH and NINDS programs including the NIH's BRAIN Initiative, the Traumatic Brain Injury Center collaborative effort between the NIH intramural program and the Uniformed Health Services University, and the multi-year work to develop and establish the NIH Office of Emergency Care Research to coordinate NIH emergency care research and research training.

Before joining NINDS, Dr. Koroshetz served as vice chair of the neurology service and director of stroke and neurointensive care services at Massachusetts General Hospital (MGH). He was professor of Neurology at Harvard Medical School (HMS) and led neurology resident training at MGH between 1990 and 2007. Over that same period, he co-directed the HMS Neurobiology of Disease Course with Drs. Edward Kravitz and Robert H Brown.

A native of Brooklyn, New York, Dr. Koroshetz graduated from Georgetown University and received his medical degree from the University of Chicago. He trained in internal medicine at the University of Chicago and Massachusetts General Hospital. Dr. Koroshetz trained in neurology at MGH, after which he did post-doctoral studies in cellular neurophysiology at MGH with Dr. David Corey, and later at the Harvard neurobiology department with Dr. Edward Furshpan, studying mechanisms of excitoxicity and neuroprotection. He joined the neurology staff, first in the Huntington's Disease (HD) unit, followed by the stroke and neurointensive care service. A major focus of his clinical research career was to develop measures in patients that reflect the underlying biology of their conditions. With the MGH team he discovered increased brain lactate in HD patients using MR spectroscopy. He helped the team to pioneer the use of diffusion/perfusion-weighted MR imaging and CT angiography/perfusion imaging in acute stroke, which is now widely employed in medical practice.

Active in the American Academy of Neurology Dr. Koroshetz chaired the professional organization's Public Information Committee, led the AAN's efforts to establish acute stroke therapy.

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Gentry N. Patrick, Ph.D.

Planning Committee Co-Chair

Gentry N. Patrick, Ph.D., is the Kavli and Dr. William and Marisa Rastetter Chancellor's Endowed Chair in Neurobiology and Professor in the Department of Neurobiology in the School of Biological Sciences at the University of California San Diego. Dr. Patrick is a leader in the field of ubiquitin-dependent protein turnover in neurons in health and neurodegenerative disease with a particular interest in the trafficking and turnover of synaptic proteins including AMPA-type glutamate receptors. Dr. Patrick received his Ph.D. from Harvard University in 1999 after working in the laboratory of Dr. Li-Huei Tsai. He was a Damon Runyon Cancer Research Foundation and a United Negro College Fund/Merck postdoctoral fellow with Dr. Erin Schuman at California Institute of Technology. Dr. Patrick joined the UC San Diego faculty in 2004. In 2021, he was named the founding Director of the Center for Empathy and Social Justice in Human Health (CESJHH) within the Sanford Institute for Empathy and Compassion (TDSI). The mission of CESJHH is to bring empathy and compassion to the work of addressing health injustice through research, communication, and advancing representation of marginalized communities in the STEM and healthcare profession pipeline.

Born and raised in South Central Los Angeles, Dr. Patrick's lived experience is a testament to the power to access, mentorship, and advocacy. His personal and professional journey into Neuroscience and academia has presented him with opportunities to leverage his own experience as an underrepresented minority student in STEM to innovate and advocate for systemic change in STEM education. Dr. Patrick is the creator and faculty director of the PATHways to STEM (PATHS) thru Enhanced Access and Mentorship scholars program. The PATHS program, now in its 6th year (cohort P6), was initially funded by a $6.9 mil grant from Chan Zuckerberg Initiative (CZI) to support partnership between UC San Diego, UC Berkeley, and University of Maryland Baltimore County (UMBC), for the replication of UMBC's Meyerhoff Scholars Program to both UC campuses.

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Andrew Breeden, Ph.D.

Andrew Breeden, Ph.D., is the Chief of the Social and Affective Neuroscience Research Program at the National Institute of Mental Health (NIMH), where he oversees a broad portfolio of human and animal research on the neurobiological mechanisms underlying affect, social behavior, and social cognition. Prior to this, he served as a Project Scientist and Program Specialist at the National Institute on Neurological Disorders and Stroke (NINDS).

Through his prior research experience studying typical and dysregulated socio-affective behaviors, as well as his Program Officer role at NIMH, Dr. Breeden brings extensive expertise on the neurobiology of empathy and prosocial behavior. He has led cross-cutting neuroscience initiatives relevant to this area of science, such as the NIMH notice of specialist interest NOT-MH-23-120 "Neural Mechanisms of Multi-

Dimensional Emotional and Social Representation."

He is also actively involved in a number of trans-NIH programs, including as co-coordinator of Investigative Human Neuroscience for the US BRAIN Initiative, and as a Project Scientist for clinical trials targeting social function in neuropsychiatric disorders.

Dr. Breeden received recognition for his contributions across NIH as a recipient of the NIH Director's Award, the NINDS Director's Award, and the NIMH Director's Award.

Richard Davison, Ph.D.

Richard Davidson, Ph.D., is the William James and Vilas Professor of Psychology and Psychiatry at the University of Wisconsin–Madison and the Founder and Director of the Center for Healthy Minds. He is best known for his groundbreaking work studying emotion and the brain. A friend and confidante of the Dalai Lama, he is a highly sought after expert and speaker, leading conversations on well-being on international stages such as the World Economic Forum, where he serves on the Global Council on Mental Health. Time Magazine named Davidson one of “The 100 Most Influential People in the World” in 2006.

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Dawn Lavell Harvard, Ph.D.

Dawn Lavell-Harvard, Ph.D., is a proud member of the Wiikwemkoong First Nation, on Manitoulin Island, and the first Aboriginal Trudeau Scholar focusing her research on increasing the rate of academic achievement for Indigenous students in mainstream education systems. Dawn has also worked to advance the rights of Indigenous women as the President of the Ontario Native Women's Association beginning in 2003. After serving as Vice-president of the Native Women’s Association of Canada for three years, Dawn was elected National President at the 41st Annual General Assembly, July 11, 2015 in Montreal, Quebec. In October 2016, after fulfilling her promise to see the MMIWG Inquiry initiated, Dawn left her role as National Leader to become the Director at the First Peoples House of Learning at Trent University, where she helps Indigenous youth achieve their dreams. Recently she has also taken on the role of co-chair for the Peterborough Community Health Center she works tirelessly to create safe, inclusive, and culturally respectful access to primary health care for those without access to a family doctor.

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Robert Malenka, M.D., Ph.D.

Robert C. Malenka, M.D., Ph.D., is the Pritzker Professor of Psychiatry and Behavioral Sciences, Director of the Nancy Pritzker Laboratory and co-founder of the Wu Tsai Neurosciences Institute at Stanford University. After graduating from Harvard College he received a Ph.D.in neuroscience and M.D. in 1982 and 1983, respectively, from Stanford University School of Medicine. Over the ensuing 6 years he completed residency training in psychiatry at Stanford and 4 years of postdoctoral research at the University of California, San Francisco (UCSF). In 1989, he was appointed Assistant Professor of Psychiatry and Physiology at UCSF, at which he reached the rank of Full Professor in 1996. In addition to running an active research program at UCSF he was the Director of the Center for the Neurobiology of Addiction and Associate Director of the Center for Neurobiology and Psychiatry. He returned to the Stanford University School of Medicine in 1999. He is an elected member of the National Academy of Sciences and the National Academy of Medicine as well as an elected fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, and the American College of Neuropsychopharmacology. He has served on the National Advisory Council on Drug Abuse and as a Councilor for the Society for Neuroscience and the American College of Neuropsychopharmacology. He is on the scientific advisory boards of numerous non-profit foundations including the Cure Alzheimer's Fund, the Brain and Behavior Research Foundation, and One Mind.

Dr. Malenka's findings have been published in >300 research papers in leading science journals. He has received numerous awards including the Kemali Foundation International Prize in Neuroscience (2000); the CINP-Lilly Neuroscience Basic Research Award (2002), the Perl/UNC Neuroscience Prize (2006), the NARSAD Goldman-Rakic Prize for Outstanding Neuroscience Research (2010), the Pasarow Foundation Award for Extraordinary Accomplishment in Neuropsychiatry Research (2011), the Society for Neuroscience Julius Axelrod Prize (2016), and the Society for Neuroscience Peter Seeburg Integrative Neuroscience Prize (2022). His laboratory continues to conduct cutting edge research on the molecular mechanisms of neural communication as well as the role of synaptic dysfunction in brain disorders including addiction, autism, and depression.

He has also co-authored a textbook entitled Molecular Neuropharmacology: A Foundation for Clinical Neuroscience (McGraw Hill, 3rd edition, 2015). His many years of investigation have produced a number of hypotheses that provide the foundation for much of the research in many of the world's laboratories that study how neurons communicate with one another and how this communication is modified during learning and by experience. His laboratory continues to conduct cutting edge research on the molecular mechanisms of neural communication as well as the role of synaptic dysfunction in brain disorders including addiction, autism, and depression.

Abigail Marsh, Ph.D.

Abigail Marsh, Ph.D., is a Professor in the Department of Psychology, Interdisciplinary Program in Neuroscience, and Interdisciplinary Program in Cognitive Science at Georgetown University. Her research employs techniques that include functional and structural brain imaging as well as behavioral, cognitive, and pharmacological approaches and aims to answer the questions: How do we understand what others think and feel? What drives us to help other people? What prevents us from harming

them? She is the author of 100+ peer-reviewed publications and an award-winning trade book, THE FEAR FACTOR (2017, Hachette).

Her research has received awards that include the Cozzarelli Prize for scientific excellence and originality from the Proceedings of the National Academy of Sciences, The S&R Kuno Award for Applied Science for the Social Good, and the Richard J. Wyatt Fellowship award for translational research from the NIMH. She is an elected fellow of the Association for Psychological Science and the Society for Personality and Social Psychology and the co-founder of the Society for the Prevention of Disorders of Aggression. She served as President of the Social and Affective Neuroscience Society from 2019-2021. She received her Ph.D. from Harvard University and conducted post-doctoral research at the National Institute of Mental Health.

William C. Mobley, M.D., Ph.D.

William Mobley, M.D., Ph.D., is Distinguished Professor of Neurosciences at UC San Diego School of Medicine. Dr. Mobley earned his Ph.D. from Stanford in Neuro- and Behavioral Science in 1974, and an M.D. from the same institution in 1976. After Pediatrics Residency at Stanford, Dr. Mobley completed a Residency and Fellowship in Neurology and Pediatric Neurology at The Johns Hopkins University in 1982.

He was appointed Assistant Professor at UCSF in 1985 and promoted to Professor in 1992. In 1997, he was appointed Chair of the Department of Neurology and Neurological Sciences at Stanford where he served as John E. Cahill Family Professor and Founding Director of the Neuroscience Institute. He moved to UC San Diego in 2009 where he was appointed Chair of Neurosciences, serving in that role until 2016 and then as Associate Dean of Neuroscience.

In 2024, he was named Founding Director of the Sanford Institute for Empathy and Compassion at UC San Diego. He is past president of the Association of University Professors of Neurology and the Professors of Child Neurology. He is currently Past President of the Trisomy 21 Research Society. Professor Mobley is a Fellow of the American Association for the Advancement of Science, a member of the National Academy of Medicine, a Fellow of the American College of Physicians, and a Fellow of the Royal College of Physicians. His research focuses on the mechanisms of neurodegenerative disorders, especially Alzheimer disease in those with Down syndrome. His lab also explores the neurobiological basis of empathy and compassion and its practical application to sustaining these attributes for those in healthcare.

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Jessica Stern, Ph.D.

Jessica A. Stern, PhD, is an assistant professor of psychological science at Pomona College, where she directs the Family, Attachment, and eMpathy (FAM) Lab. Her research examines how early experiences shape the developing brain and behavior, with a focus on attachment processes, empathy, and prosocial behavior in children and adolescents. She is a recipient of the National Science Foundation Graduate Research Fellowship award, the Society for Research in Child Development Dissertation Funding Award, and a National Research Service Award from the

National Institutes of Health to study the neurobiology of empathy in infancy. She earned her PhD in developmental psychology from the University of Maryland, College Park and completed a postdoctoral research fellowship at the University of Virginia.

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- Filing a complaint with the (OHR) (Keck WS302 Hours: 9am - 4pm ET, Monday-Friday; hrservicecenter@nas.edu; Phone: 202-334-3400; Fax: 202-334-3850)at 202-334-3400, or
- Reporting the incident to an employee involved in the activity in which the member or volunteer is participating, who will then file a complaint with the Office of Human Resources.

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