NINDS / AUPN / ANA / CNS

June 24-25, 2016 • Sofitel Lafayette Square • Washington, DC

Combining Clinical and Research Careers in Neuroscience

Association of University Professors of Neurology

National Institute of Neurological Disorders and Stroke

National Institutes of Health

HOW TO COMBINE CLINICAL AND RESEARCH CAREERS IN NEUROSCIENCE

The Association of University Professors of Neurology (AUPN) together with the National Institute of Neurological Disorders and Stroke (NINDS), the American Neurological Association (ANA) and the Child Neurology Society (CNS) welcome you to the clinician-scientist mentoring course.

Goals: The goals of this course are to: 1) encourage medical students with neuroscience research training to pursue clinical training (with special emphasis on neurology) and choose clinician-scientist careers, 2) describe and discuss strategies for successfully melding clinical and research careers, 3) discuss the satisfactions and power of a combined research and clinical career, 4) describe and discuss sources of and strategies for obtaining training and research support, and 5) provide an opportunity for students to meet academicians who have successfully combined clinical and research careers in neuroscience.

Expectations: We are interested to know the impact of this course on the career-development experience of our student attendees. To this end we must collect both immediate and long-term information about our student participants. This information will help us justify federal support for future mentoring courses and will allow us to modify the program to be maximally responsive to student needs. Please give us your feedback. We are counting on a 100% response rate to the brief questionnaires you will receive via email following the course.

Bruce R. Ransom, MD, PhD
Symposium Organizer

David J. Fink, MD
Past President, AUPN

Walter Koroshetz, MD
Director, National Institute of Neurological Disorders and Stroke
National Institutes of Health

COURSE ORGANIZERS

Bruce R. Ransom, MD, PhD
Symposium Organizer, University of Washington

Allan Levey, MD
Co-Symposium Organizer, Emory University

Stephen J. Korn, PhD
National Institute of Neurological Disorders and Stroke
National Institutes of Health, Bethesda

Walter Koroshetz, MD
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Support Staff

Katie Fernstaedt
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Table of Contents

How to Combine Clinical and Research Careers in Neuroscience Symposium
Sofitel/Washington, DC June 24-25, 2016

Evaluation

Please take a moment to complete the course evaluation

COMBINING CLINICAL AND RESEARCH CAREERS IN NEUROSCIENCE SYMPOSIUM

Sofitel Lafayette Square
806 - 15th Street NW
Washington, DC 20005
Friday, June 24 – Saturday, June 25, 2016

Sponsored by: National Institute of Neurological Disorders and Stroke (NINDS), Association of University Professors of Neurology (AUPN), American Neurological Association (ANA) and Child Neurology Society (CNS).

AGENDA

Friday, June 24, 2016 – *Meeting and meals will take place in Paris Ballroom*

6:30 - 7:30 p.m.	**Registration and Cocktail Reception**
7:30 - 7:45 p.m.	**Welcome and Opening Remarks** *Speaker: Bruce R. Ransom, MD, PhD, U. of Washington (Director) & Allan Levey, MD, PhD, Emory U. (Co-Director)*
7:45 - 8:45 p.m.	**Dinner**
8:45 - 9:15 p.m.	**Combining Clinical and Research Careers: How I Am Doing It** *Speaker: Kumar Narayanan, MD, PhD, University of Iowa Carver College of Medicine*

Saturday, June 25, 2016 – *Meeting and meals will take place in Paris Ballroom*

8:30 - 9:15 a.m.	**Registration and Continental Breakfast**
9:15 - 10:00 a.m.	**Combining Clinical and Research Careers in Neuroscience: An Overview** *Speaker: Bruce R. Ransom, MD, PhD, University of Washington*
10:00 - 10:45 a.m.	**The Value of Clinician Scientists** *Speaker: Walter Koroshetz, MD, Director, National Institute of Neurological Disorders and Stroke*
10:45 - 11:00 a.m	**Break**
11:00 – 12noon	**Panel Discussion** *Moderated by: Bruce R. Ransom, MD, PhD, (Director) & Allan Levey, MD, PhD, (Co-Director)*
12noon - 1:30 p.m.	**Networking Lunch**

1:30 - 2:15 p.m. **Funding for Research Training and Career Development**
Speaker: Stephen J. Korn, PhD, National Institute of Neurological Disorders and Stroke (NINDS), National Institutes of Health (NIH)

2:15 - 3:00 p.m. **Physician-Scientist: Career and Family: Can You Have It All?**
Speaker: Christina M. Marra, MD University of Washington School of Medicine

3:00 - 3:15 p.m. **Break** *(in Madeleine Room)*

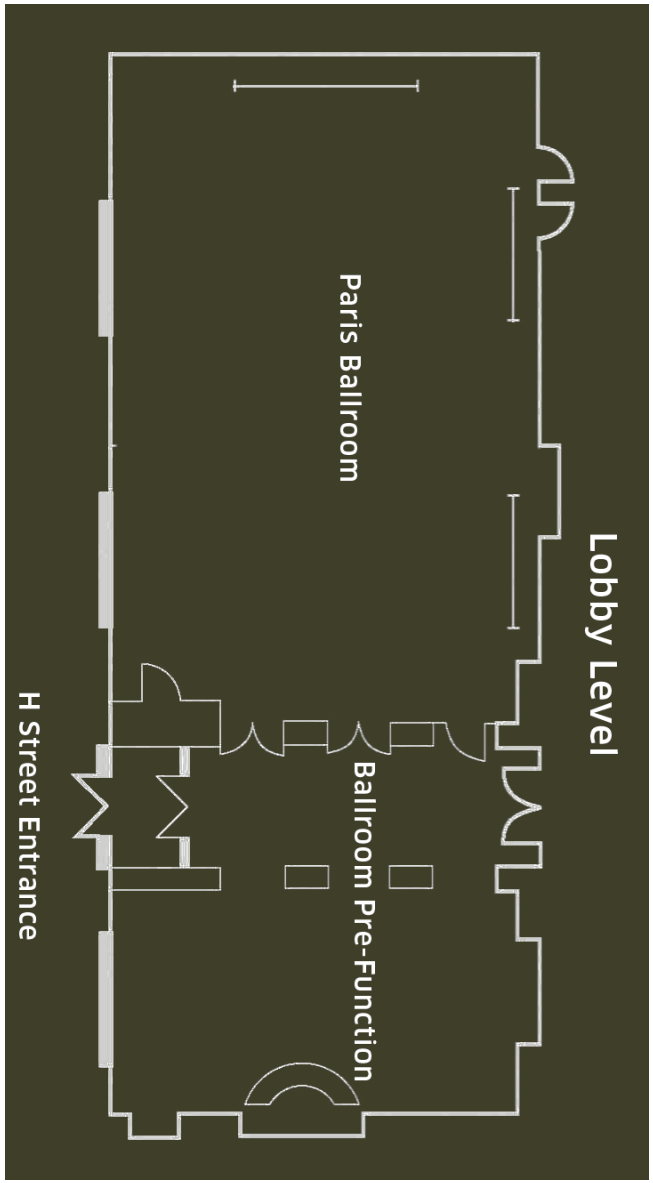
Meeting Room Assignments for Small Group Breakouts

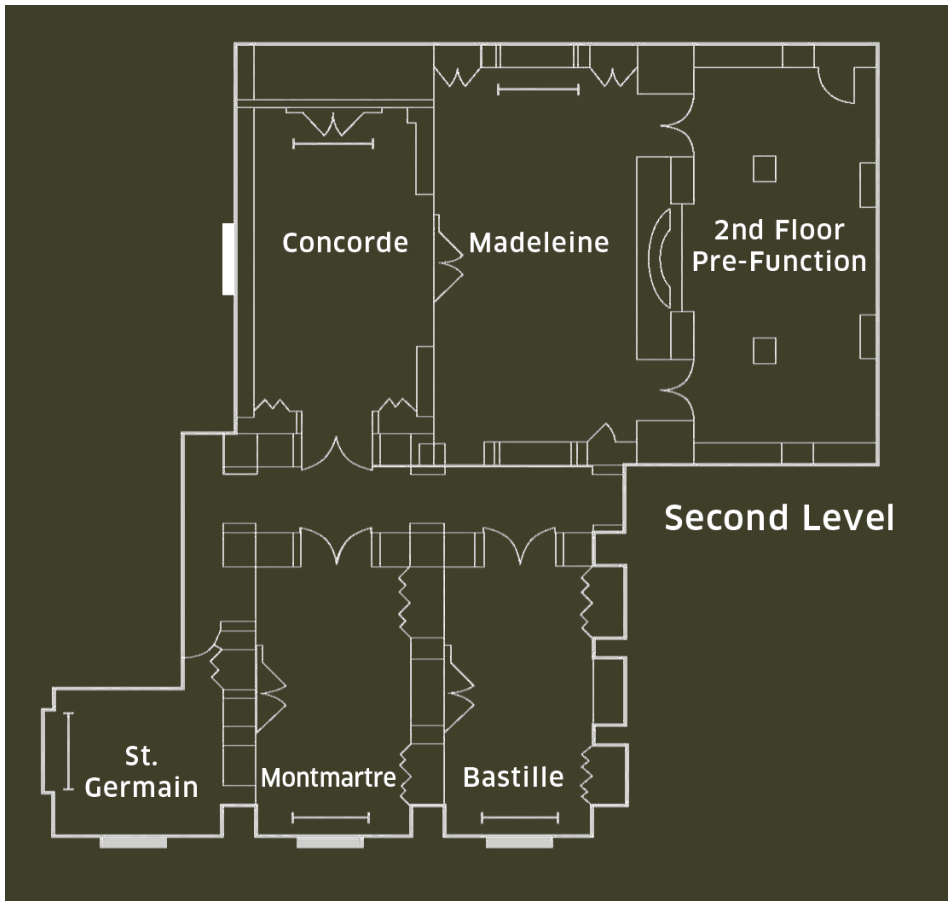
Facilitated by Symposia speakers and special invited guests.

3:15 – 4:30 p.m. **Small Group Breakouts**

Group 1: MEETING ROOM: Madeleine
Group 2: MEETING ROOM: Paris Ballroom
Group 3: MEETING ROOM: Montmartre
Group 4: MEETING ROOM: Condorde
Group 5: MEETING ROOM: Bastille

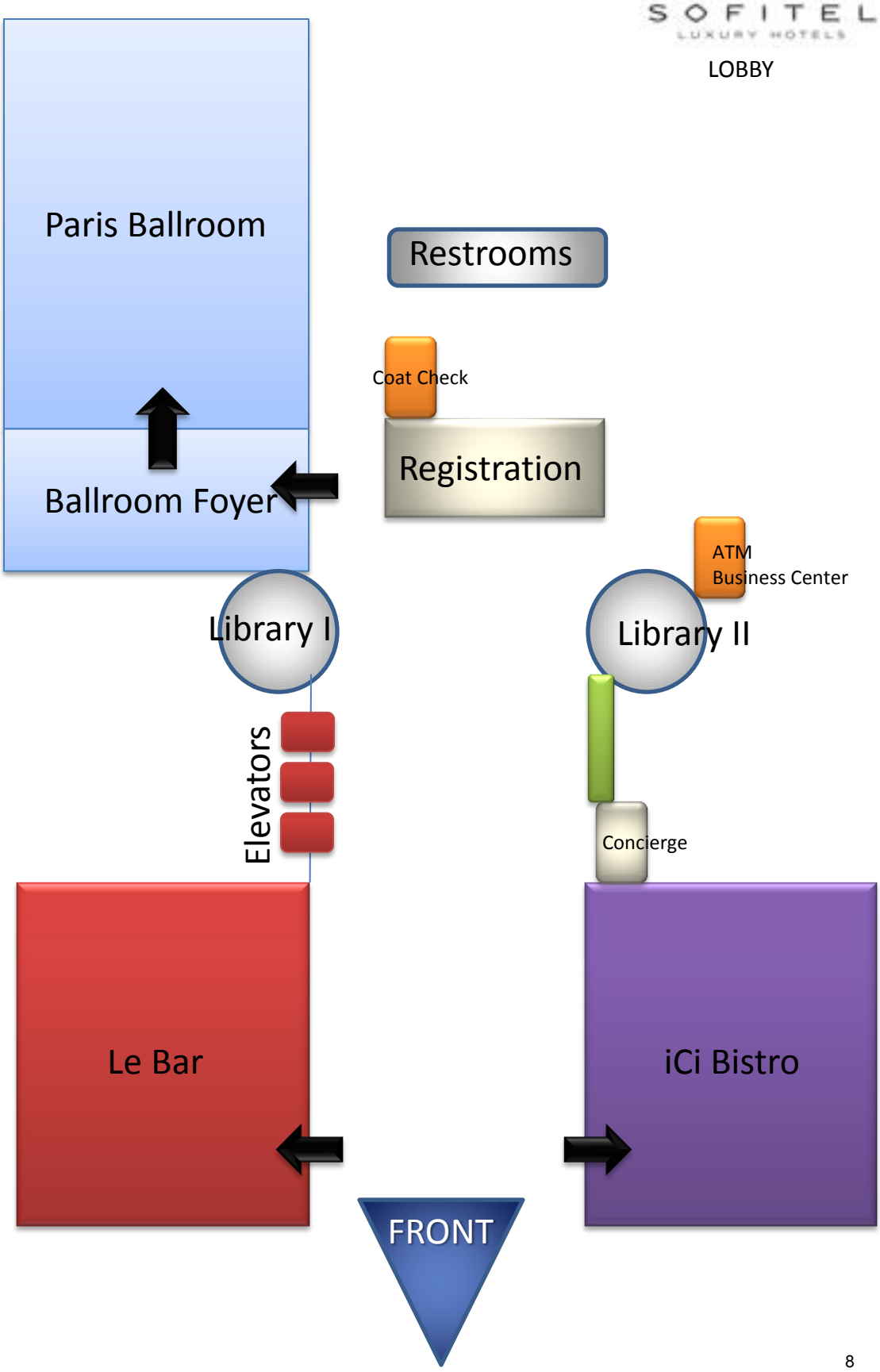
4:30 - 6:30 p.m. **Final Cocktail Reception (Ballroom Pre-Function Space)** – *hors d'oeuvres will be served*


Lobby Level
Paris Ballroom
Ballroom Pre-Function
H Street Entrance


Concorde
Madeleine
2nd Floor
Pre-Function
Second Level
St.
Germain
Montmartre
Bastille

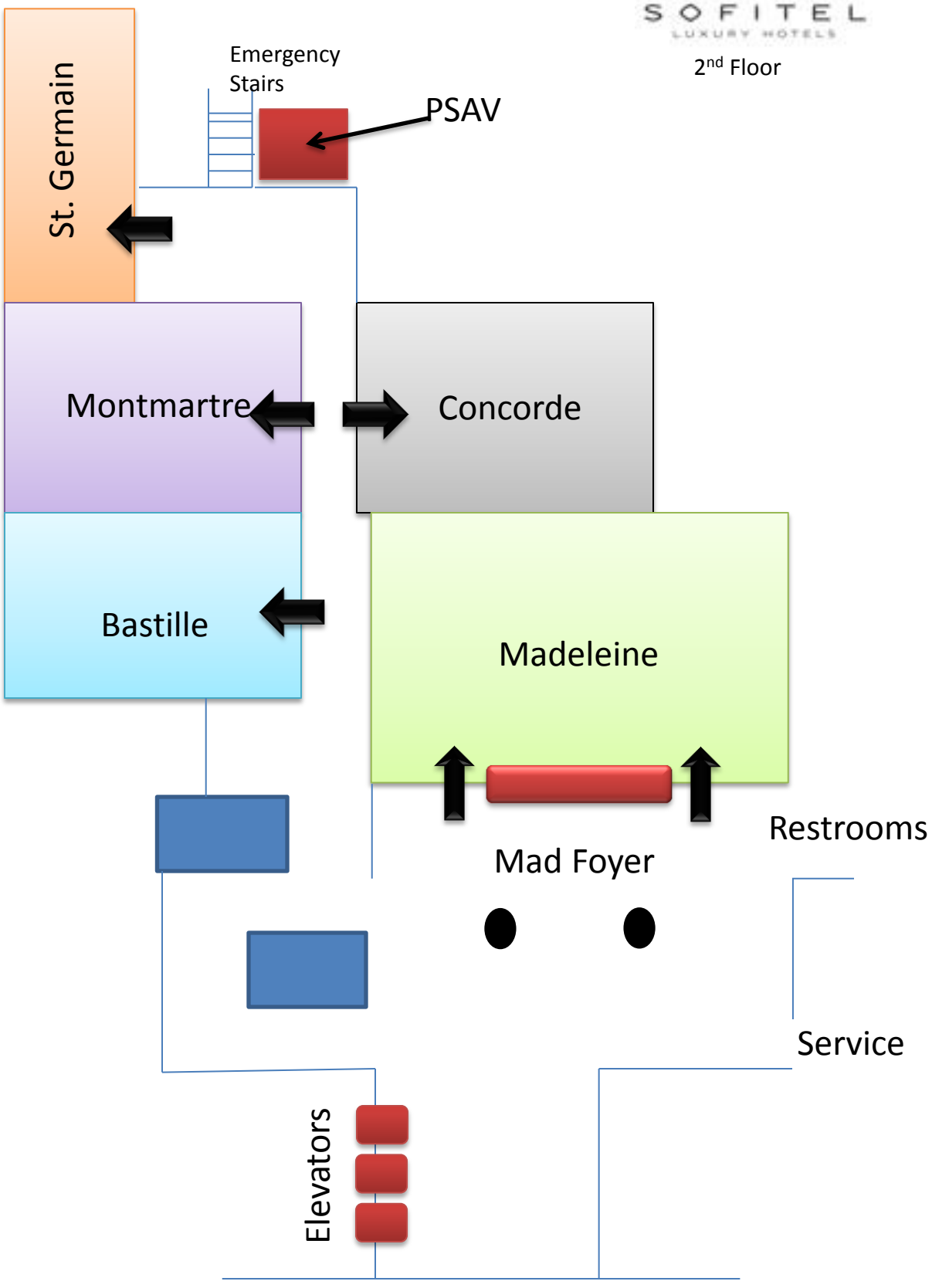
SOFITEL
LUXURY HOTELS

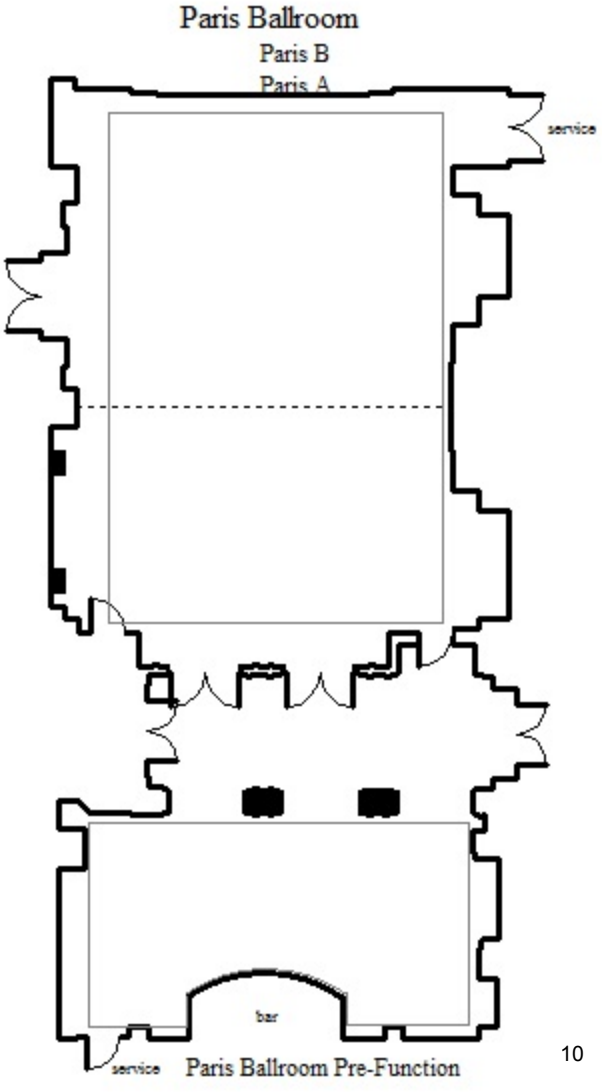
LOBBY



SOFITEL
LUXURY HOTELS

2nd Floor




Paris Ballroom
Paris B
Paris A
service
bar
service
Paris Ballroom Pre-Function

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BLK01100 Rooming List by Name (no Rate)

Room No.	Name	Conf. No.	Arr. Date	Dep. Date	Room Type	Res. Status	Adl.	Chl.	Nts.	Rms.
				Carr. Code						
Block Code	**AUPN624 AUPN 2016 Meeting**									
	Ahrendsen,Jared	23608742	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Allette,Yohance	23608743	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Amin,Neal	23608744	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Cederquist,Gustav	23608745	06-24-16	06-26-16	KGB	GRD	1	0	2	1
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	Cheng-Hathaway,Paul	23608748	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Chuang,Tzu-Ying	23608749	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Corkrum,Michelle	23608750	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	DeStefino,Nicholas	23608751	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Edlow,Brian	23608752	06-24-16	06-25-16	KGB	GRD	1	0	1	1
	Fabiszak,Margaret	23608753	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Fernstaedt,Katie	23608754	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Fink,David	23608755	06-24-16	06-27-16	KGB	GRD	1	0	3	1
	Fox,Laura	23608756	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Giardina,Christopher	23608757	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Harris,James	23608758	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Hartmann,David	23608759	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Howard,Clare	23608760	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Huang,Sherri	23608761	06-23-16	06-26-16	KGB	GRD	1	0	3	1
	Ishaque,Mariam	23608762	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Jayaraman,Divya	23608763	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Ji,Sunggoan	23608764	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Jiang,Sirui	23608765	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Kannarkat,George	23608766	06-24-16	06-25-16	KGB	GRD	1	0	1	1
	Kinsman,Brian	23608767	06-24-16	06-25-16	KGB	GRD	1	0	1	1
	Kulbe,Jacqueline	23608769	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Lane-Donovan,Courtney	23608770	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Levey,Allan	23608771	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Liu,Eulanca	23608773	06-23-16	06-26-16	KGB	GRD	1	0	3	1
	Liu,Jessica	23608772	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Luo,Minmin	23608774	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	MacGibeny,Margaret	23608775	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Marra,Christina	23608776	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	McKenzie,Andrew	23608777	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Meves,Jessica	23608778	06-24-16	06-26-16	KGB	GRD	1	0	2	1
	Munoz-Miranda,William	23608779	06-24-16	06-26-16	KGB	GRD	1	0	2	1

BLK01100 Rooming List by Name (no Rate)

Room No.	Name	Conf. No.	Arr. Date	Dep. Date	Room Type	Res. Status	Carr. Code	Adl.	Chl.	Nts.	Rms.
	Narasimhan,Sneha	23608780	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Narayana,Kumar	23608781	06-24-16	06-25-16	KGB	GRD		1	0	1	1
	Parikshak,Neelroop	23608782	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Pellegrino,Peter	23608783	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Price,Amanda	23608784	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Qing,Kurt	23608785	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Ransom,Bruce	23608786	06-24-16	06-25-16	KGB	GRD		1	0	1	1
	Reyes,Sahily	23608787	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Sandweiss,Alex	23608789	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Savjani,Ricky	23608790	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Schor,Nina	23608791	06-24-16	06-25-16	KGB	GRD		1	0	1	1
	Shah,Sahil	23608792	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Sisti,Alexander	23608793	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Smith,Joshua	23608794	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Speltz,Rebecca	23608795	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Sweis,Rebecca	23608796	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Talati,Pratik	23608797	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Valtcheva,Manouela	23608798	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Wen,Sherry Cai	23608799	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Wosiski-Kuhn,Marlena	23608800	06-24-16	06-26-16	KGB	GRD		1	0	2	1
	Total Block Code AUPN624 AUPN 201		**Reservations**	**57**				**57**	**0**	**112**	**57**
	Grand Total		**Reservations**	**57**				**57**	**0**	**112**	**57**

Last Name	First Name	Breakout Group	Meeting Room 3:15-4:00pm
Ahrendsen	Jared	4	Condorde
Allette	Yohance	3	Montmartre
Amin	Neal	4	Condorde
Cederquist	Gustav	1	Madeleine
Chen	Haiwen	4	Condorde
Chen	QiLiang	4	Condorde
Cheng-Hathaway	Paul	1	Madeleine
Chuang	Tzu-Ying	4	Condorde
Corkrum	Michelle	1	Madeleine
Davis	Stephanie	1	Madeleine
DeStefino	Nicholas	3	Montmartre
Fabiszak	Margaret	1	Madeleine
Fox	Laura	1	Madeleine
Giardina	Christopher	3	Montmartre
Harris	James	1	Madeleine
Hartmann	David	1	Madeleine
Howard	Clare	2	Paris Ballroom
Huang	Sherri	3	Montmartre
Ishaque	Mariam	3	Montmartre
Jayaraman	Divya	4	Condorde
Ji	Sunggoan	3	Montmartre
Jiang	Sirui	2	Paris Ballroom
Kannarkat	George	4	Condorde
Kinsman	Brian	2	Paris Ballroom
Kulbe	Jacqueline	2	Paris Ballroom
Lane-Donovan	Courtney	5	Bastille
Liu	Jessica	2	Paris Ballroom
Liu	Eulanca	2	Paris Ballroom
Luo	Minmin	5	Bastille
MacGibeny	Margaret	2	Paris Ballroom
McKenzie	Andrew	2	Paris Ballroom
Meves	Jessica	3	Montmartre
Munoz-Miranda	William	5	Bastille
Narasimhan	Sneha	5	Bastille
Parikshak	Neelroop	5	Bastille

Pellegrino	Peter	5	Bastille
Price	Amanda	2	Paris Ballroom
Qing	Kurt	5	Bastille
Reyes	Sahily	4	Condorde
Sandweiss	Alex	4	Condorde
Savjani	Ricky	5	Bastille
Shah	Sahil	2	Paris Ballroom
Sisti	Alexander	3	Montmartre
Smith	Joshua	5	Bastille
Speltz	Rebecca	1	Madeleine
Sweis	Brian	3	Montmartre
Talati	Pratik	4	Condorde
Valtcheva	Manouela	5	Bastille
Wen	Sherry Cai	5	Bastille
Wosiski-Kuhn	Marlena	1	Madeleine

Breakout Group Faculty Assignments

Group 1 (1-2 years of research): **MEETING ROOM: Madeleine:** Dr. Narayanan & Dr. Edlow
Group 2 (2 years of research): **MEETING ROOM: Paris Ballroom:** Dr. Ransom
Group 3 (2-3 years of research): **MEETING ROOM: Montmartre:** Dr. Levey
Group 4 (3-4 years of research): **MEETING ROOM: Condorde:** Dr. Korn & Dr. Fink
Group 5 (4+ years of research): **MEETING ROOM: Bastille:** Dr. Marra & Dr. Schor

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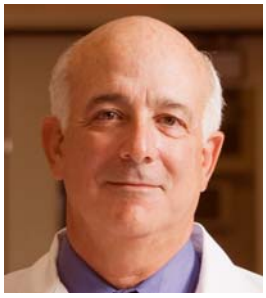
Faculty & Mentor Biographies

Brian Edlow, MD, Harvard Medical School

Dr. Edlow received his B.A. from Princeton University and M.D. from the University of Pennsylvania School of Medicine. He completed an internal medicine internship at Brigham and Women's Hospital, followed by neurology residency and neurocritical care fellowship at Massachusetts General Hospital and Brigham and Women's Hospital. He is currently a critical care neurologist at Massachusetts General Hospital, where he is Associate Director of the Neurotechnology Trials Unit and Director of the Laboratory for NeuroImaging of Coma and Consciousness. Dr. Edlow's research is devoted to the development of advanced imaging techniques for detecting brain activity and predicting outcomes in patients with severe traumatic brain injury. The goals of this research are to improve the accuracy of outcome prediction and to facilitate new therapies that promote recovery of consciousness. Dr. Edlow receives support from the National Institutes of Health, Department of Defense, and American Academy of Neurology/American Brain Foundation.



David Fink, MD, University of Michigan Hospitals

Dr. Fink is Robert Brear Professor and Chair of the Department of Neurology at the University of Michigan. He is a graduate of Yale College and Harvard Medical School and completed residencies in internal medicine at the Massachusetts General Hospital, in neurology at UCSF and a post-doctoral fellowship in neurochemistry at the NIH.
Dr. Fink's research is focused on the development of gene transfer vectors for diseases of the nervous system. He has taken a viral-based vector developed in his laboratory to successful completion of the first human clinical trials of gene therapy for the treatment of pain, and is moving forward with a clinical trial to determine whether a neurotrophin-expressing vector can prevent neuropathy. Dr. Fink's research has been supported since 1982 by grants from the NIH and the Department of Veterans Affairs. He is the author of more than 170 peer reviewed publications and 25 book chapters, co-inventor on 6 issued patents, and serves on the editorial boards of the journals Gene Therapy and Neurotherapeutics. He is the immediate past president of the Association of University Professors of Neurology, Vice Chair of the Board of the United Council for Neurologic Subspecialties, and a member of the Board of Directors of the American Neurological Association. In 2014 Dr. Fink was the recipient of the Paul B. Magnuson Award for Research from the Department of Veterans Affairs.

Stephen Korn, PhD, NINDS, NIH

Dr. Korn came to NINDS as Director of the Office of Training, Career Development and Workforce Diversity in January, 2006. He received his Ph.D. in Pharmacology from the University of North Carolina- Chapel Hill, and received postdoctoral training at NIH and at the Roche Institute of Molecular Biology. He then spent 15 years on the faculty of the University of Connecticut at Storrs, where he was a Full Professor. His area of scientific specialty is the molecular

basis of ion channel gating and permeation, but he has also conducted electrophysiological and imaging research on calcium and pH transport/buffering, and synaptic transmission in the hippocampal slice. Dr. Korn oversees most training opportunities at NINDS, and with regard to clinicians, has developed novel programs for residents and fellows, neurosurgeons and pediatric neurologists. He has also modified expectations for the review of clinician-scientists with the goal of increasing their success while speeding their course of training.

Walter Koroshetz, MD, NINDS, NIH

Walter Koroshetz, M.D. is the Director of the National Institute of Neurological Disorders and Stroke (NINDS) and works to manage the taxpayers' investment of $1.5 billion in NINDS research to advance neuroscience and reduce the burden of illness due to neurological disorders. Before coming to NIH, Dr. Koroshetz was a Harvard Professor of Neurology, Vice Chair of Neurology at the Mass General Hospital, Director of Stroke and Neurointensive Care, and a member of the Huntington's disease unit. His research activities spanned basic neurobiology to clinical trials. A graduate of Georgetown University and University of Chicago Medical School, he trained in internal medicine and neurology.

Allan I. Levey, MD, PhD, Emory University School of Medicine, Symposium Co-Organizer

Dr. Levey is the Goizueta Foundation Endowed Chair for Alzheimer's Disease Research, and the Betty Gage Holland Professor and Chairman of the Department of Neurology at Emory University. He is also Director of the Emory Alzheimer's Disease Research Center, and Executive Associate Dean for Research in the School of Medicine. Dr. Levey has secondary faculty appointments in the Departments of Pharmacology and Psychiatry and Behavioral Sciences. Dr. Levey received a BS from University of Michigan and an MD and PhD (Immunology) from the University of Chicago. He also trained in Neurology at Johns Hopkins, molecular biology at the National Institutes of Health, and then joined the Johns Hopkins faculty in the Departments of Neurology & Pathology. Dr. Levey has been at Emory University since 1991, where he has held a number of positions, including Director of Graduate Studies for the Neuroscience PhD Program, Founding Director of the Emory Center for Neurodegenerative Disease, and Director of the Emory MD/PhD Training Program. Dr. Levey is a neurologist and neuroscientist internationally recognized for his work in neurodegenerative disease. He has more than 300 research publications, contributing to understanding the brain systems and mechanisms involved in Alzheimer's disease and other neurodegenerative diseases. Current research is focused on discovery of novel molecular targets and advancing their development towards predictive biomarkers and new therapeutic strategies. His team leads a national Accelerating Medicine Partnership for Alzheimer's Disease research project with NIH and industry, focusing on proteomics discovery of novel targets. He also leads a $25 M Healthy Aging Study of mid-life biomarkers for AD. He has received many awards including the Derek Denny-Brown Neurological Scholar Award from the American Neurological Association, the Heikkila Research Scholar Award from the National Parkinson

Foundation, the Team Hope Award for Medical Leadership from the Huntington's Disease Society of America, and he was inducted into the Johns Hopkins Society of Scholars. Dr. Levey has also been named an ISI Highly Cited Researcher in the field of Neuroscience and has consistently been listed among one of the Best Doctors in America. Under his leadership, the Department of Neurology is ranked among the top ten departments in the United States for research and among the top clinical programs by US News and World Report.

Christina M. Marra, MD, University of Washington

Dr. Marra completed residency training in Neurology and fellowship training in Infectious Diseases at the University of Washington. She is Professor and Vice Chair for Academic Affairs in Neurology, and has an adjunct appointment in Medicine (Infectious Diseases), at the University of Washington. She directs a NIH-funded clinical and translational research program on syphilis and neurosyphilis, for which she received the American Sexually Transmitted Diseases Association Achievement Award in 2014. Dr. Marra also participates in multi-center clinical research on the neurological consequences of HIV, and provides general neurological care in inpatient and outpatient settings, including a multispecialty HIV clinic.

Kumar Narayanan, MD, PhD, University of Iowa

Nandakumar (Kumar) Narayanan is a neurologist and neuroscientist specializing in Parkinson's disease at the University of Iowa. He is from Seattle, Washington, and attended Stanford University. After working at a startup and some travel through the middle east and Himalaya, he joined the medical scientist-training program at Yale University, doing his doctoral work in the laboratory of Mark Laubach. He stayed at Yale for a neurology residency, doing postdoctoral work at the same time in the laboratory of Ralph DiLeone. He started a new laboratory at the University of Iowa studying how dopamine affects cortical circuits.

Bruce R. Ransom, MD, PhD, FAAN University of Washington, Symposium Organizer

Bruce R. Ransom, MD, PhD, FAAN is Professor and Chair of the Department of Neurology at the University of Washington School of Medicine. He is Adjunct Professor in the Department of Physiology and Biophysics and also holds the Warren and Jermaine Magnuson Chair in Medicine for Neurosciences.

Dr. Ransom obtained his M.D. and Ph.D. (Neurophysiology) degrees at Washington University in St. Louis. After his internship, he spent 3 years as a postdoctoral research fellow at the NIH and then completed his Neurology residency at Stanford, where he stayed on as a faculty member. He moved to Yale University in 1987, where he was Professor of Neurology and of Cellular and Molecular Physiology, and Director of the Outpatient Neurology Clinic. He took his current positions at the University of Washington

in Seattle in 1995 and became the founding chair of the new Department of Neurology. The department has grown rapidly under his leadership and now consists of about 70 faculty engaged in research, clinical work, and teaching. He serves as co-leader of the UW Medicine Neurosciences Institute.

Dr. Ransom is an authority on the physiology and function of glial cells and on the pathophysiology of neural injury, especially ischemic injury of CNS white matter. He has served on scientific advisory boards for the NIH, the Howard Hughes Medical Institute, the Max Planck Society and the Paralyzed Veterans of America Spinal Cord Research Foundation. He received the Javits Neuroscience Investigator Award from the NIH (1991 to 1998), the Alexander von Humboldt Research Award (2005), teaching awards from Stanford and Yale, and has delivered several named lectureships. He was a Decade of the Brain lecturer for the American Academy of Neurology. He is the founder and Editor-in-Chief of the journal *GLIA*, and serves on the editorial boards of other journals. The third edition of his edited textbook, Neuroglia, published in 2013.

Dr. Ransom has three children. His oldest son is an MSTP graduate and neurologist. Personal interests include downhill skiing, fishing and travel. He is an avid collector and has an extensive collection of petrified wood; in fact, several pieces of his furniture are made from petrified wood.

Nina F. Schor, MD, PhD, Child Neurology Society

Dr. Nina F. Schor is the seventh Chair of the Department of Pediatrics and the William H. Eilinger Professor of Pediatrics at the University of Rochester Medical Center. She is also Pediatrician-in-Chief of the Golisano Children's Hospital at Strong and Professor in the Departments of Neurology and Neurobiology & Anatomy. Before arriving in Rochester, she was the Chief of the Division of Child Neurology in the Department of Pediatrics at Children's Hospital of Pittsburgh. She was Professor of Pediatrics, Neurology, and Pharmacology at the University of Pittsburgh and held the Carol Ann Craumer Endowed Chair in Pediatric Research at Children's Hospital of Pittsburgh. A native of New York City, Dr. Schor received her BS in Molecular Biophysics and Biochemistry from Yale University, her MD from Cornell University, and her PhD from Rockefeller University. Her work at Rockefeller University resulted in awarding of a U.S. Patent and an IND from the FDA for development of a mucolytic agent for use in children with cystic fibrosis. She did her Pediatrics and Child Neurology residencies at Harvard University, Children's Hospital of Boston, and the Longwood Area Neurology Program. Dr. Schor heads a research effort aimed at design and development of new strategies for treating tumors of the nervous system, including neuroblastoma and pheochromocytoma and for understanding the developmental mechanisms underlying neurodegenerative diseases like Alzheimer's and Parkinson's diseases. She served as Associate Dean for Medical Student Research at the University of Pittsburgh. Dr. Schor's research has been continuously funded by the National Institutes of Health, among other agencies, since 1988. Dr. Schor has been a Counselor of the Society for Pediatric Research, Counselor and Secretary-Treasurer of the Child Neurology Society, and President of Professors of Child Neurology. She is currently Immediate Past-president of the Child Neurology Society and a member of the Executive Council of the American Pediatric Society and the Science Committee of the American Academy of Neurology.

The long road: worth the view

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: Narayanan, Nandakumar

eRA COMMONS USER NAME: nnarayanan

POSITION TITLE: Assistant Professor

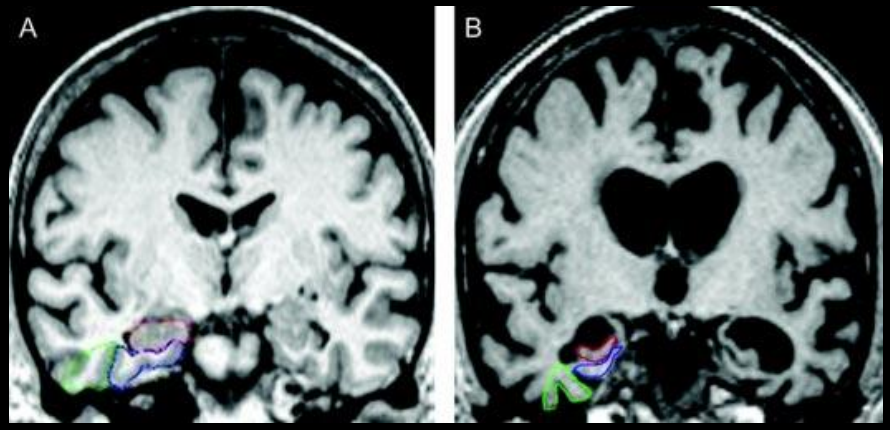
EDUCATION/TRAINING

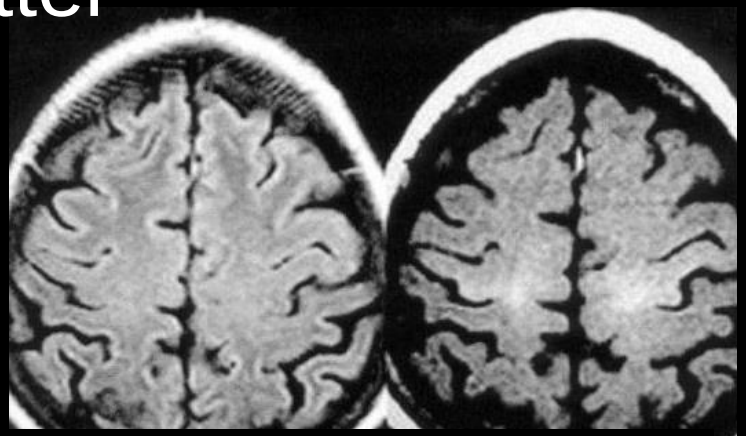
INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Stanford University, Stanford, CA	AB	06/2000	Human Biology (Neuroscience)
Yale Medical School, New Haven, CT	MD	05/2008	
Yale University, New Haven, CT	PHD	05/2008	Neuroscience
Hospital of St Raphael, New Haven, CT	Resident	07/2009	Internal Medicine
Yale-New Haven Hospital, New Haven, CT	Resident	07/2012	Neurology
Yale University, New Haven, CT	Postdoctoral Research	07/2012	Ralph DiLeone's laboratory (concurrent with residency)

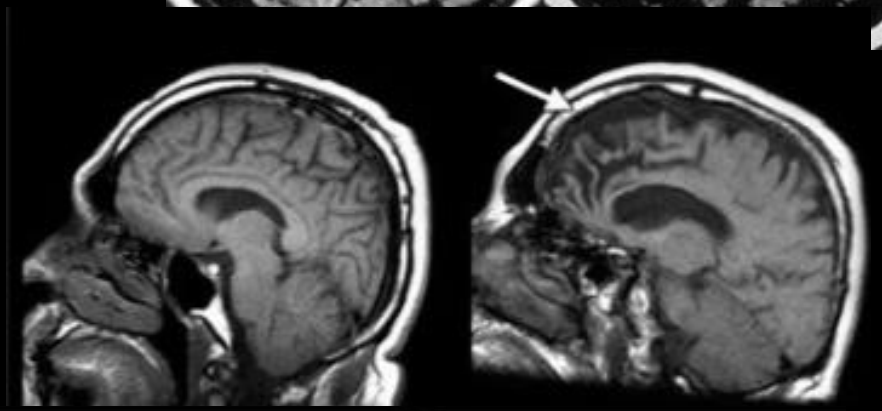
A. Personal Statement

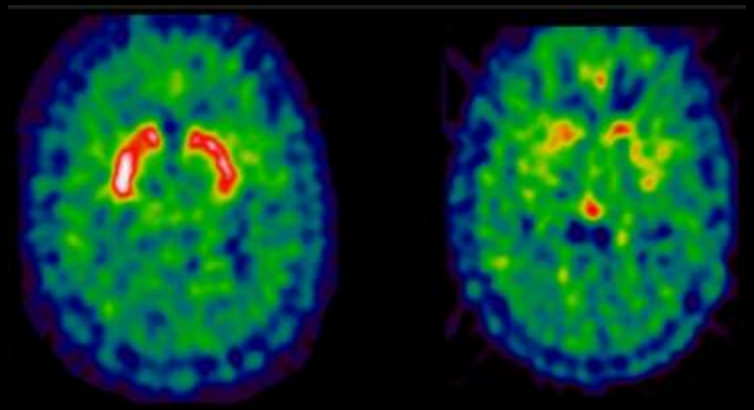
I am a board-certified neurologist and a neuroscientist who studies animal models of Parkinson's disease with a focus on cognition. Our lab maps how dopamine affects cortical circuits in humans and rodents. I have the scientific expertise, clinical background, and drive to successfully carry out this proposal. My *scientific background* is in systems neuroscience with key proficiency in neurophysiology, animal models of cognitive control, and optogenetics. As an undergraduate, I became enthralled with the prefrontal cortex via my fMRI studies in the laboratory of John Gabrieli, then at Stanford. As a doctoral student at Yale in the laboratory of Mark Laubach, I recorded from neuronal ensembles in rodent medial frontal and motor cortex during timing tasks. As part of this work, I developed several novel behavioral and analytical tools. I expanded on this work during my postdoctoral work in the laboratory of Ralph DiLeone at Yale, where I learned new molecular, viral, and optogenetic techniques to selectively and specifically manipulate neuronal circuits in behaving animals. My *clinical expertise* is in multidisciplinary Parkinson's disease-related care and brain stimulation. Every week, I diagnose ~3 Iowans with Parkinson's disease. While I can treat their motor symptoms with levodopa and brain-stimulation, I have few clinical therapies for cognitive symptoms of Parkinson's disease. My struggle in clinic every week with this disease intensely motivates me. **My clinical time is capped at 15%.**

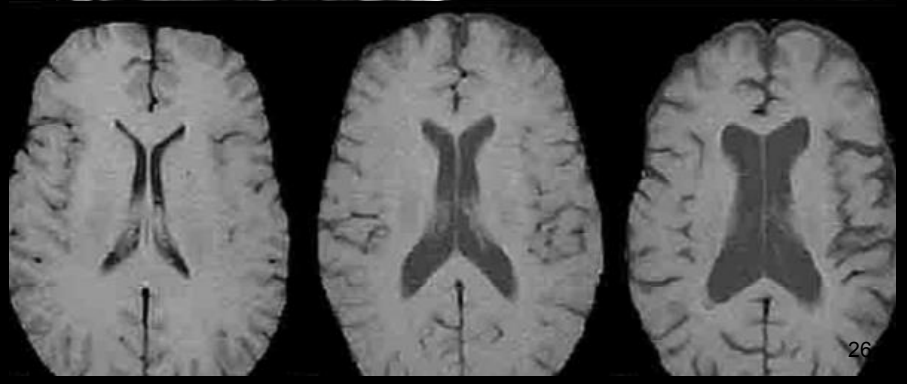
We need to treat neurological disease better











Focus….on your patients

Mentors

Medicine

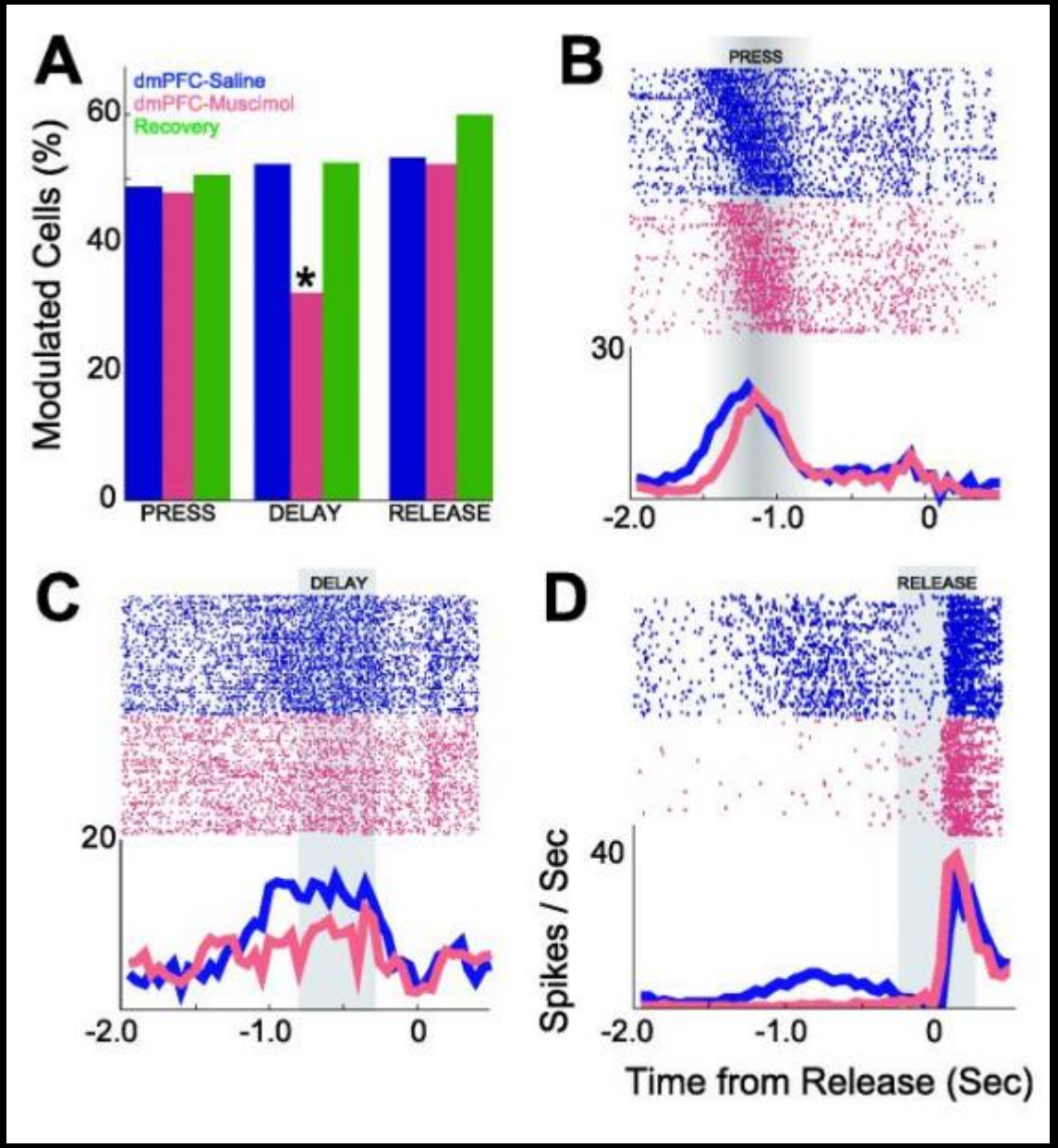



Science




Patient BG

- 42 yo woman with early-onset idiopathic PD
- Struggled with movements vs. non-motor symptoms (impulsivity, hallucinations, paranoia)
- On sinemet / seroquel
- Fell down the stairs after reporting that she was threatened by hallucinations
- Admitted to YNHH MICU, died of nosocomial complications



Narayanan and Laubach 2006

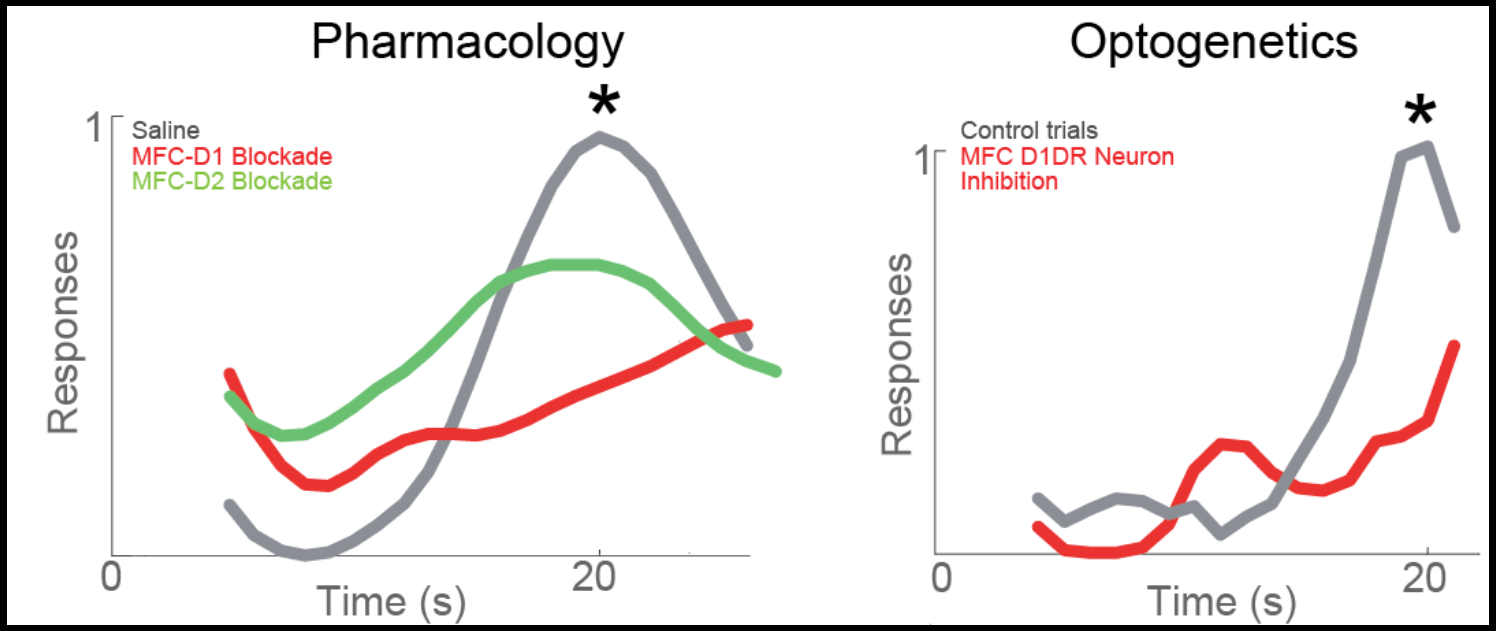
- What was wrong with BG’s frontal cortex?
- What did dopamine have to do with it?

2009: Neurology Residency at Yale

With permission

Dr. Diana Richardson, West Haven VAMC

Medial frontal D1 dopamine receptor blockade impairs interval timing



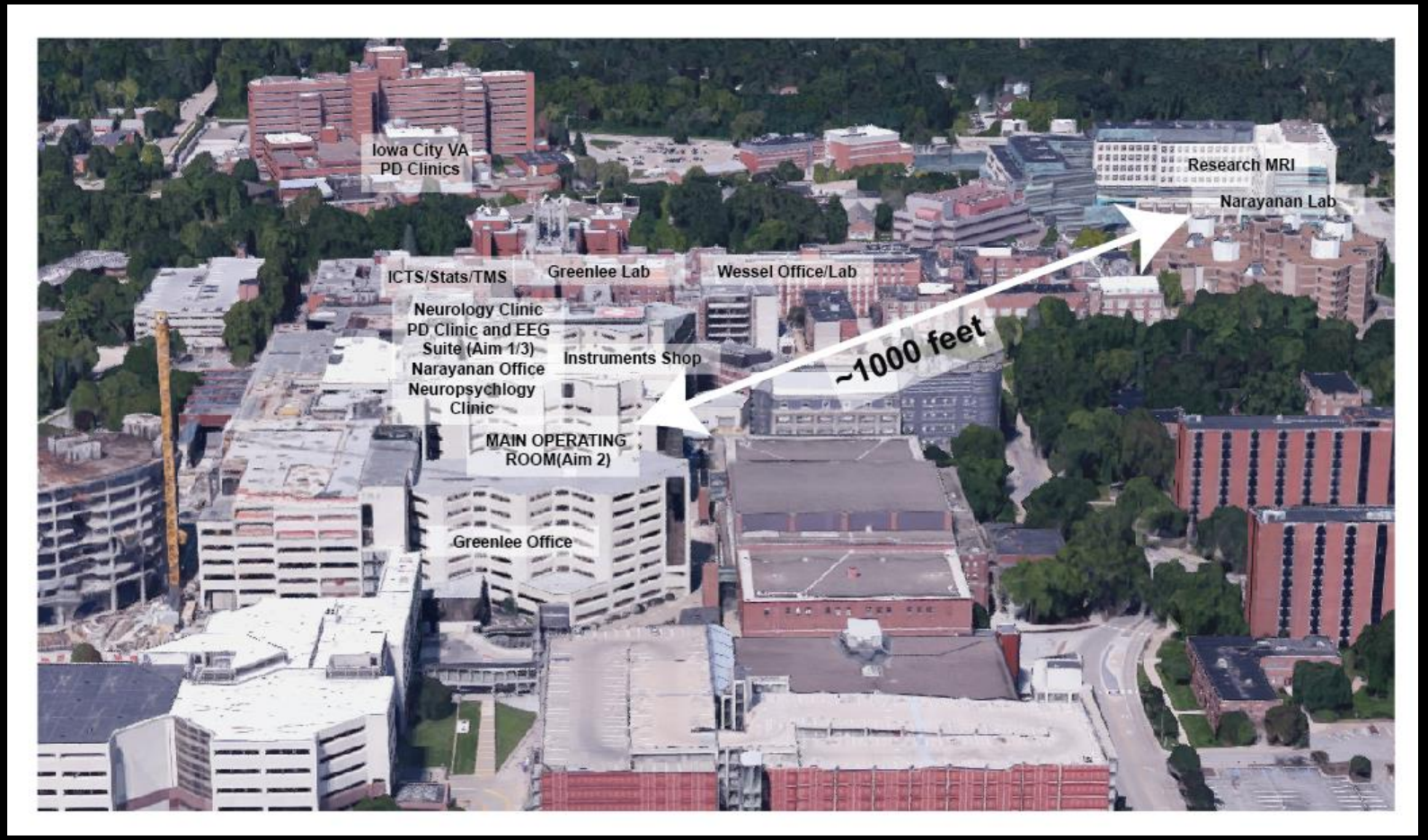
9 rats / 5 mice

Narayanan et al., 2012

2012: NINDS K08

- Apply early!
- Excellent career training plan
- 1-2 figures of key prelim data (2-3 data points)
- Build on what you and your advisor can do
- Must clearly point the way to the future!

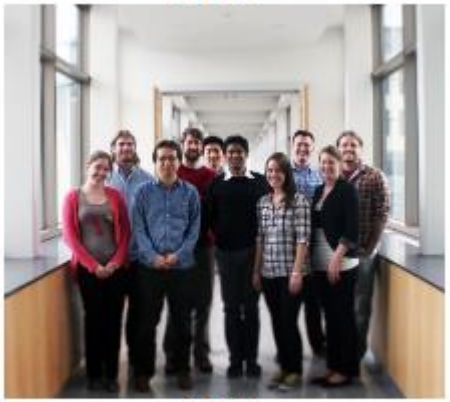
2012: New lab at the University of Iowa



Fellowship?

- *Only Parkinson's disease!*
- *Multidisciplinary care*
- *Started during residency continuity clinics*
- *Formal mentorship with Dr. Rodntizky in my weekly clinics*
- *Cannot master all of neurology or even one specialty – I was going to be as good as I can be at **one thing***

2015



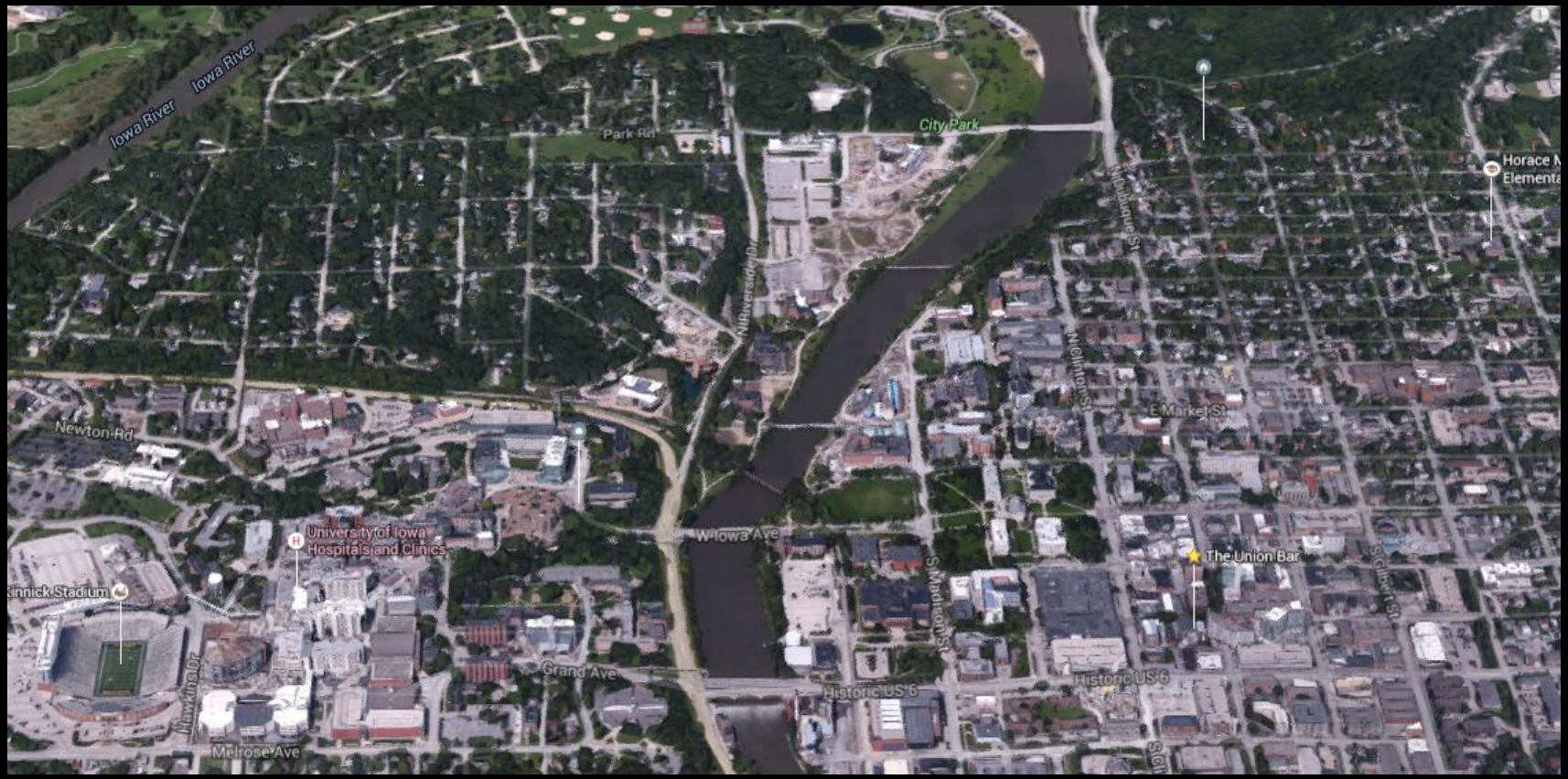
2014

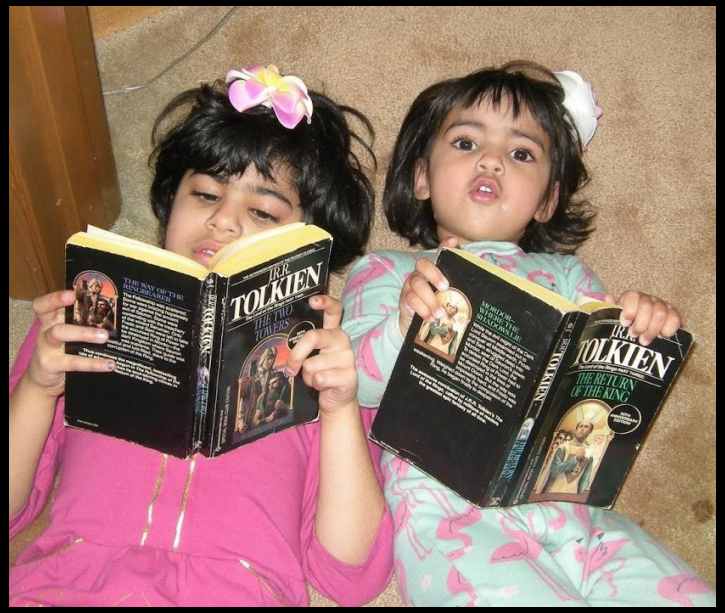
2013

Since 2012:
9 original scientific reports
6 reviews
3 case reports
4-5 collaborative articles

1 R01 (2 more out!)
3 foundation grants
3 UI pilot grants

Iowa City – A key tool




J.R.R.
TOLKIEN
THE TWO TOWERS
J.R.R.
TOLKIEN
THE RETURN OF THE KING

Daily schedule

- ~5:00 AM – 7:00 AM – write (grants) / run
- 7:00 AM – 8:30 AM – wrangle kids
- 8:30 AM - ~4:45 PM – research not reddit
- 4:45 – 9:00 PM – wrangle kids
- 9:00 – 11 PM – relax

All breakfasts and dinners with the family…

Weekly schedule

Tuesday AM clinic – only Parkinson's disease

The rest of the time – research!

Advice!

- Start with your patients
- Try to pick a direction as early as you can…
- Find help! Mentors, colleagues, program officers
- Enjoy the journey…because the destination is far off!

NINDS K08 / R01 (Narayanan)
Aging Mind and Brain (Narayanan)
University of Iowa - Neurology
NARSAD (Parker, Kim, Narayanan)

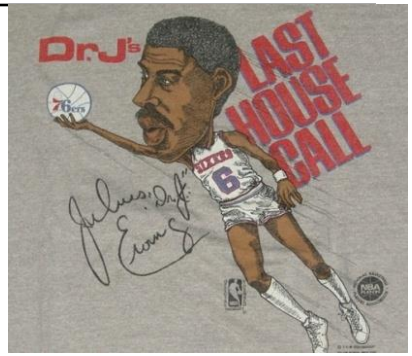
Questions?

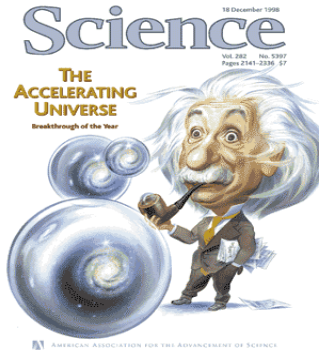
Physician-Scientist Career Development: The NINDS Perspective

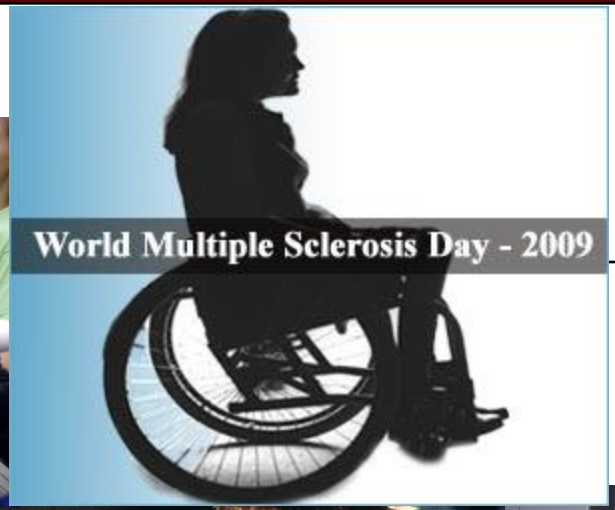
Walter Koroshetz, M.D..
Director
NINDS

So you want to be a Physician-Scientist? What's that all about?

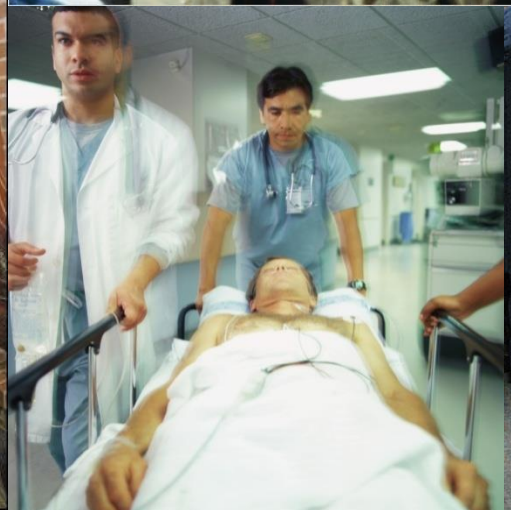
- The big three questions:
  - What do you want to do with your life?
    - NBA is out, you already chose to be a neuro doc! It's important to remember why?
  - How much fulfillment do you get out of figuring things out?
  - How important is it to you that you advance the field?
    - The impact factor.






World Multiple Sclerosis Day - 2009


4 MONTHS OLD BABY LOREN
HELP FIGHT SMA

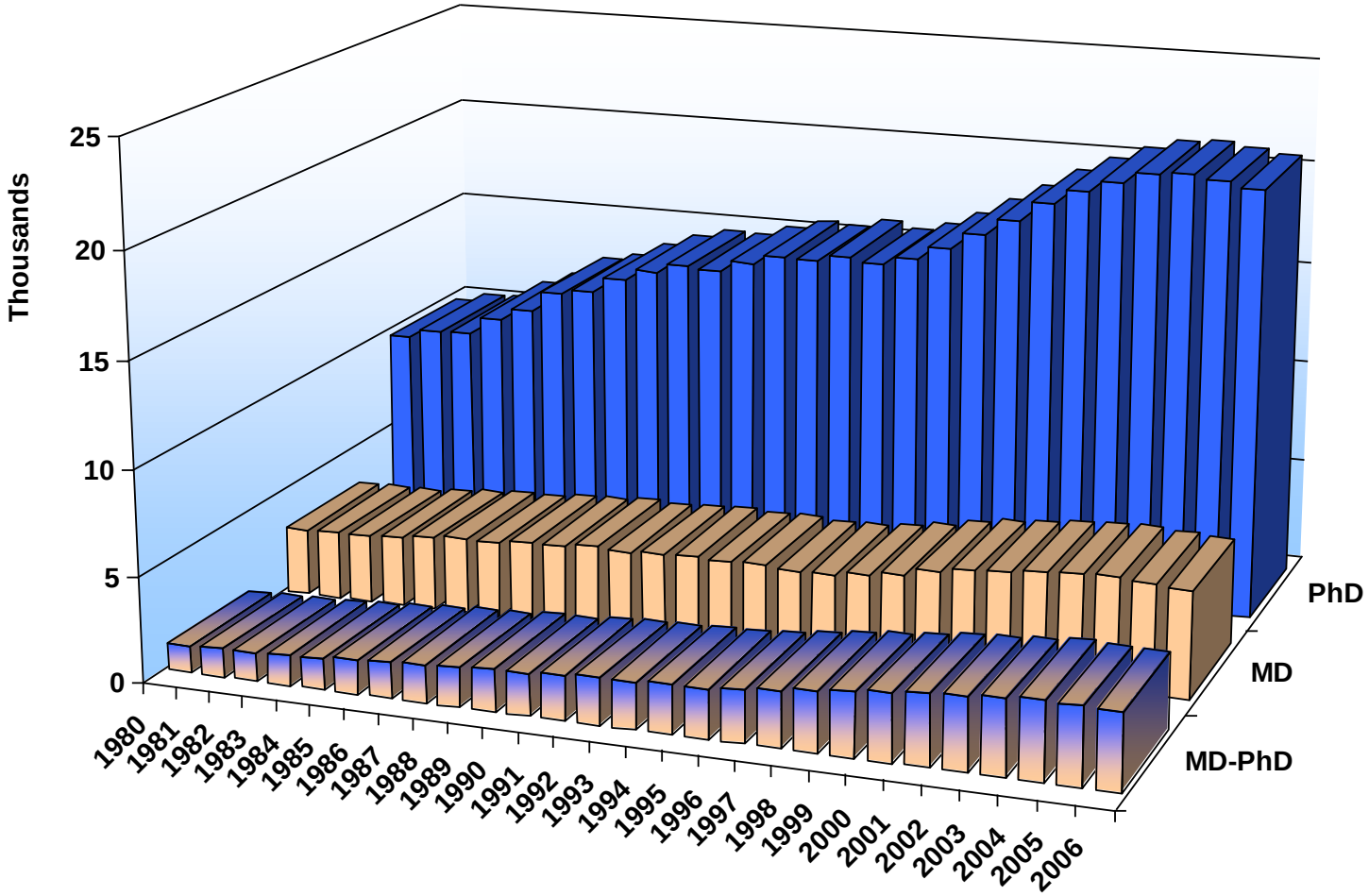


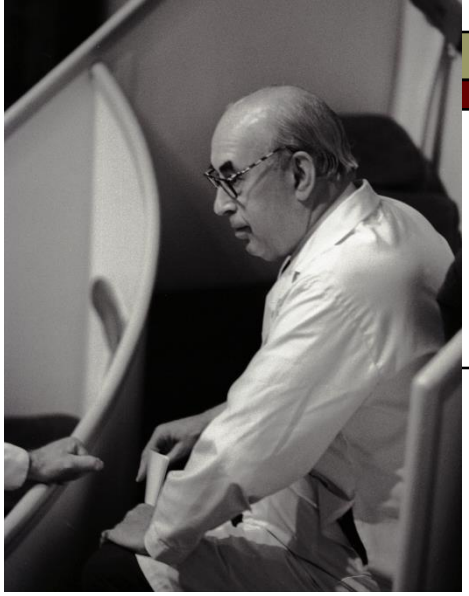
They need you to discover!

- Patient's problems are usually bigger than our knowledge base.
- Much of what we know is wrong.
- We don't have a clue about what we really need to know.
- Pick what you feel is the most important question. No reason to settle for a default.

Number of NIH R01-Equivalent

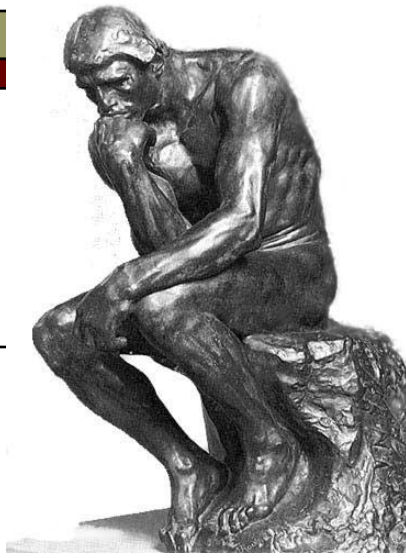
Awards by Applicant's Degree, FY 1980 - 2006





Who are you?

Too Big to FAIL!



Academic success- 16 years pre med school
Med School, Residency, Fellowship

One of 30-40 K awardees granted by NINDS per year.
150 K awardees/ 1 billion persons with neurological disorders
150 K awardees/ 5.6 billion NIH dollars in neuroscience
~ 1million of taxpayer funds invested/per K awardee

You are the expert in your disease. That's where your inherent value comes from. That's not grant dependent.

They need you to integrate patient c and research.

- The advance of neurological treatment is marred by the exclusion of research from the culture of patient care.
  - Patients don't know about research, most doctors don't promote patient participation in research. Patients are wary of participating in research.
- The "***epiphany***": Most neurological breakthroughs have come from patient car under the eye of a "researcher".
- The "***real thing***": knowing when a science advance can really make a difference.

We need you to play your position on the American Research Team.

Components of the Modern Academic Research Team*.

A. Basic laboratory

(MD/PhD, Ph.D, fellows- MDs, MD PhDs or PhDs);

B. Subspecialty clinic

(MD, MD. Ph.D, health professional, ie. nurse, Phys/Speech Therapist); MD fellows in clinical training.

C. Clinical research

(MD, MD PhD, clinical coordinator, research nurse, data base managers), MD fellows in research. collaboration with interdepartmental clinical research- ie. clinical labs, imaging, genomics, etc.

*** Team composed of people at various levels of expertise so inherent to medical teams is mentoring.**

We need you to lead.

- Hospital, Medical School, NeuroSocieties,
- Government- Federal, State, Local.
- Non-Governmental Organizations
- Community- schools, politics

*Someone has to make the big decisions, why not you?

They need you to make money for the American pharmaceutical industry.

- Pharma is in crisis.
  - Profits going down, cost of development going up
  - Major pharma jettisoning R&D
  - Major pharma running away from CNS disorders
- America's pre-eminence in biological science has to translate to commercial products or patients see no benefit.
- Economy could use a stimulus too!

We need you to persist.

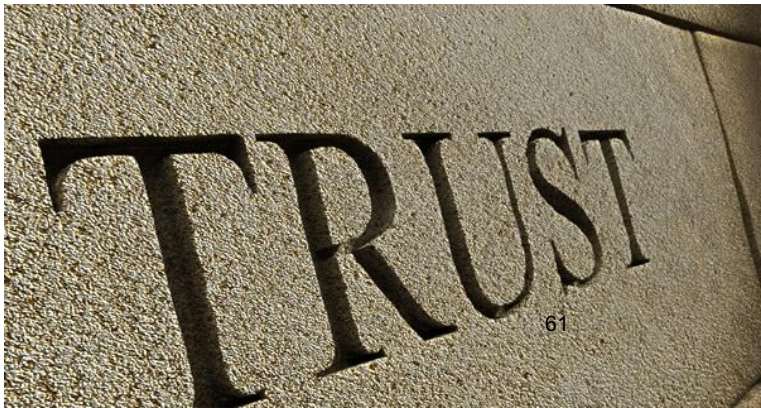
- Failure is part of the game.
  - It's going to work, just not on the first try.
  - It's going to work, but can't convince someone to pay for it.
  - Just not going to work.

- Re-inventing yourself can be invigorating.

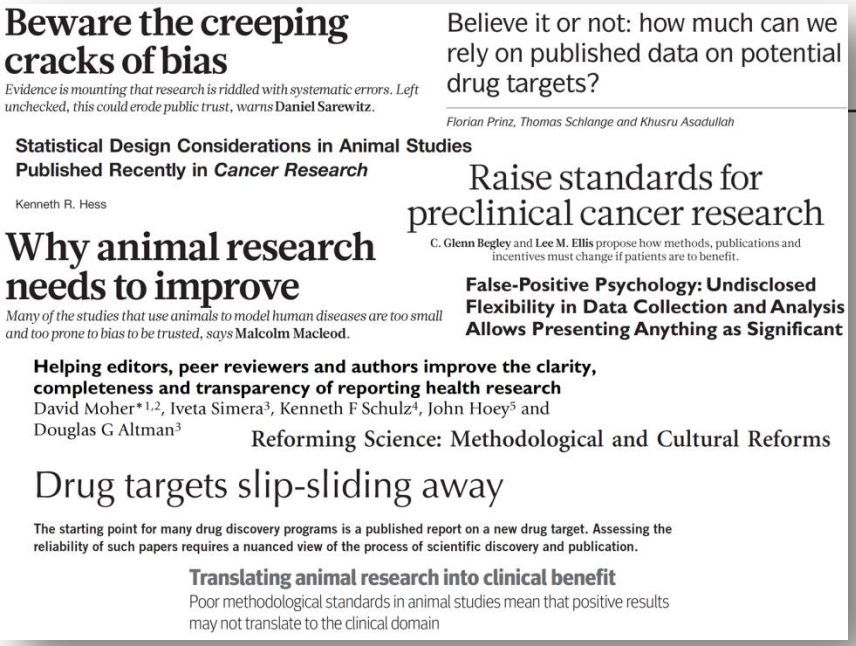
They need you to be persistent.

We need you to be scientifically honest.

- Bad data is destructive to the overall effort.
- Even if you get some early mileage from dressing up bad data it will eventually drag you down.



Enhancing Reproducibility and Transparency of Research Findings



Underlying Issues

- Poor training
- Poor evaluation
- Perverse reward incentives

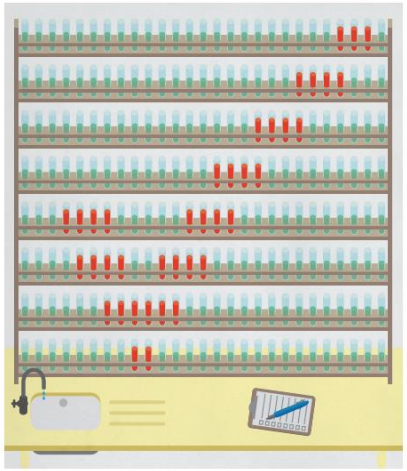
Principles for Addressing these Issues

1. Raise community awareness
2. Enhance formal training
3. Improve the evaluation of applications
4. Protect the integrity of science by adoption of more systematic review processes
5. Increase stability for investigators

NOT-OD-15-103: Enhancing Reproducibility through Rigor and Transparency

Four areas of clarification:

- Scientific premise
- Rigorous experimental design
- Consideration of relevant biological variables, such as sex
- Authentication of Key Biological and/or Chemical Resources



outnumbered by the hundreds of thousands published each year in good faith.

Instead, a complex array of other factors seems to have contributed to the lack of reproducibility of research increased emphasis on novelty over statements in details; and basic elements of Crucial experiments are all too frequently ing, random calculation. And some 'sauce' to make and withholding describe the petitive edge scientists will to further b Exacerbating and attitudes centres and ing agencies the overvalu high-profile tres also pre in such jour tenure, and rewards[6]. Then the not publish researchers papers that viously publi ing the prob unpublished

COMMENT

NIH to balance sex in cell and animal studies

Collins unveil policies to ensure that preclinical l Institutes of Health considers females and males.

stakeholders including publishers. This move is essential, potentially very powerful and need not be difficult or costly.

BETTER WITH BOTH

Certain rigorous studies evaluating the effects of sex differences have been effective in bridging the divide between animal and human work. One example concerns multiple sclerosis (MS). Women are more susceptible to MS than men are, but develop less-severe forms of the disease. The most widely accepted MS animal model — rodent experimental autoimmune encephalomyelitis (EAE) — has revealed[7] that sex differences in MS are related to both reproductive and non-reproductive factors. Findings[8] that oestrogen therapy provided benefits in rodent EAE

NIH plans t reprodu

Francis S. Collins and **Law** initiatives that the US Nati is exploring to restore the s preclinical

A growing chorus of concern, from scientists and laypeople, contends that the complex system for ensuring

PERSPECTIVES

CELL BIOLOGY

Fixing problems with cell lines

Technologies and policies can improve authentication

By **Jon R. Lorsch**[*†], **Francis S. Collins**[*], **Jennifer Lippincott-Schwartz**[*‡]

Despite the important role of cell culture in the study of biology and medicine, evidence has accumulated that cell lines are frequently misidentified or contaminated by other cells or microorganisms. This can be a substantial problem in many fields, such as cancer research, where drugs are initially tested using a cell line derived from the targeted type of tumor (*1*). If a drug is tested on the wrong cell line, research can lead to unreliable results, and discovery of effective treatments can be delayed. Even in basic research, use of mistaken cell lines can hinder progress because of variations in cell behavior among different cell types. Given these concerns, developing corrective measures for cell line misidentification and contamination warrants renewed attention.

Since the 1960s, more than 400 widely used cell lines worldwide have been shown to have been misidentified (*2*, *3*). Cells originally thought to have been derived from one tissue type have later been found to be from a different tissue. In some cases, even the species of the cells has been misidentified. A 2011 study of 122 different head and neck cancer cell lines revealed that 37 (30%) were misidentified (*4*). Analyses of a variety of tissue culture collections and cells sent to repositories for curation and storage from labs in the United States, Europe, and Asia suggest that at least 15% of cell lines are misidentified or contaminated (*4*, *5*).

Misidentified cell lines can create problems at many levels of biomedical research. For example, studies using just two misidentified cell lines were included in three grants funded by the U.S. National Institutes of Health (NIH), two clinical trials, 31 patents, and >100 papers (*6*). Nonetheless, the need for validation and accurate reporting of cell line identity does not appear to be widely recognized by researchers; a 2013 study found that fewer than half of cell lines were unambiguously identified in published studies (*7*).

A number of factors contribute to the problems of cell line misidentification and contamination. For example, inadvertently using a pipette more than once when working with different cell lines in culture can lead to cross contamination. If the contaminating cell line divides more rapidly than the original cells, it can quickly dominate the population, changing the identity of the culture. This event often goes undetected because cells from dif-

POLICY

1452 19 DECEMBER 2014 • VOL 346 ISSUE 6216

Corrected 19 December, 2014; see full text.

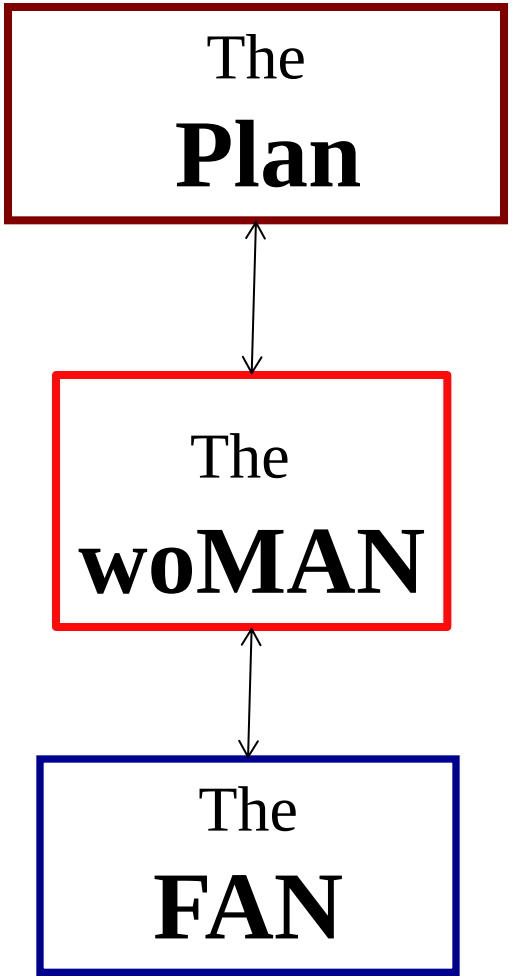
Published by AAAS

sciencemag.org SCIENCE

NIH

- Committed to developing clinician scientists.
- In the end however extramural NIH is a granting agency and not an employer.
  - Based on peer review.
  - Institutes will attempt to steer a small portion of research in pursuit of the common good.
    - Networks, Tools for Science, Stimulate research to overcome bottlenecks, fill needs (RFAs, Workshops)

Research Career Development
The 3 Things



- Make sure you get outstanding **mentoring** –
  do not underestimate its importance

- It's critical that you **publish**…
  - Focus on **quality publications** (does not have to be Cell, Science, Nature)
  - Balance publications vs. preliminary data
- Devote enough **time to crafting your grant** –
  the bar is high, as it should be
  Get a recently funded K award to read.
  Get someone to critique specific aims 3 months before submission
- Do not underestimate the importance of **networking**.
  - Connect with your disease non-profit organization.

NINDS Bridging the Gaps

PhD

PhD and MD/PhD Fellowships

MD

R25 and Stroke Net Training

Resident/ Fellow

K08/K 23

Loan Repayment

Junior Staff

K02

Independent Investigator

RO1

NINDS R25: research support for residents and fellows

Neurology, Neurosurgery, Neuroradiology Neuropathology, Neuroanasthesia and Emergency Medicine

- Institutional award started in 2009
- 25 institutional programs now funded
- Supports research by residents; these residents can continue to receive support into fellowship
- Over 81 residents supported so far
- 32 supported for 2 years

The National Institute of Neurological Disorders and Stroke (NINDS)

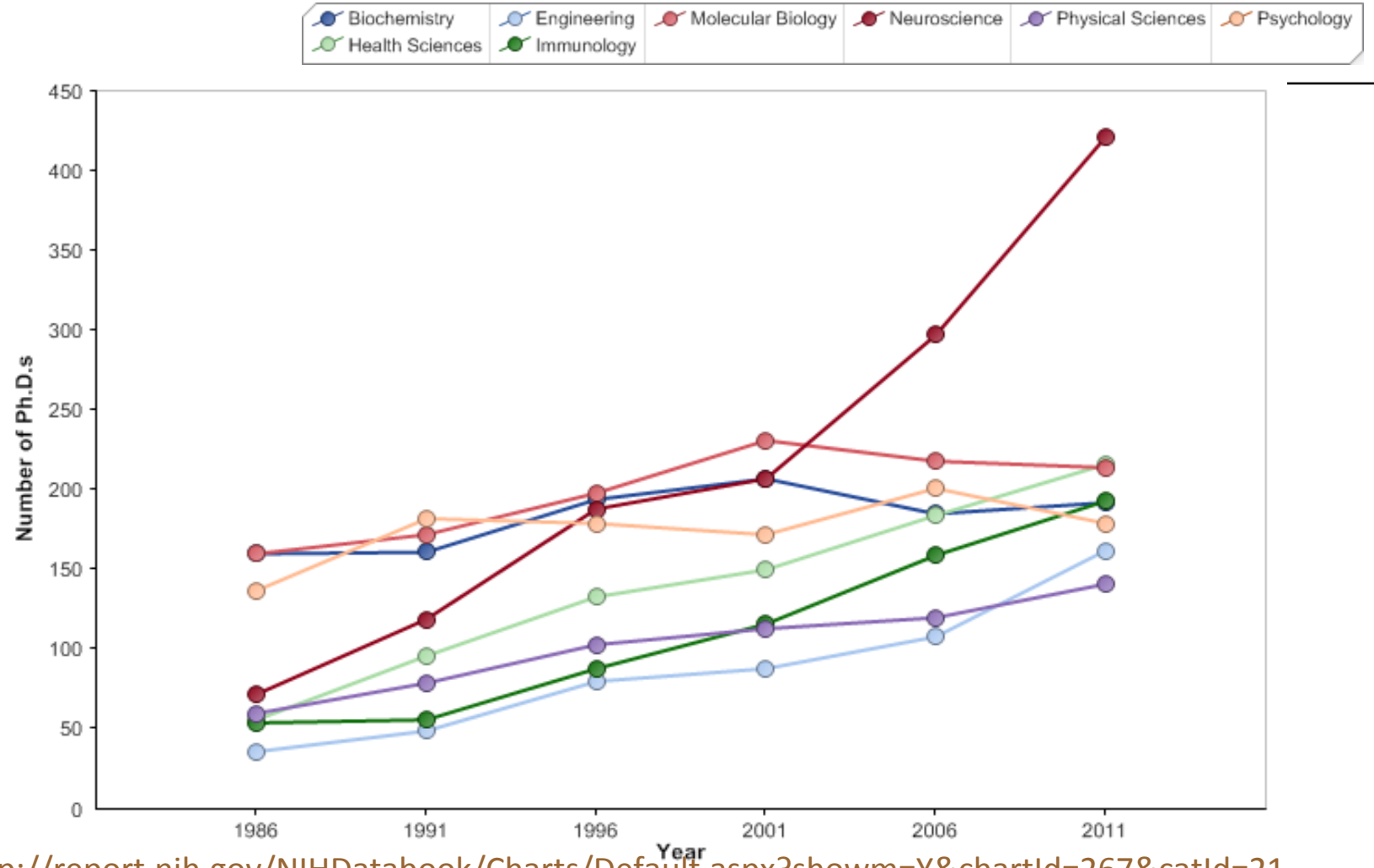
The mission of NINDS is to seek fundamental knowledge about the brain and nervous system and to use that knowledge to reduce the burden of neurological disease.

Strategies:

- Invest across the full spectrum of basic, translational, and clinical research
- Establish a data-driven process to identify unmet scientific opportunities and public health needs within and across neurological diseases
- Support research resources and technical advances that catalyze new discoveries
- Communicate and collaborate with the public and with others involved in biomedical research
- Train a robust and diverse neuroscience research workforce
- Adopt a culture of evaluation and continuous improvement across all NINDS programs

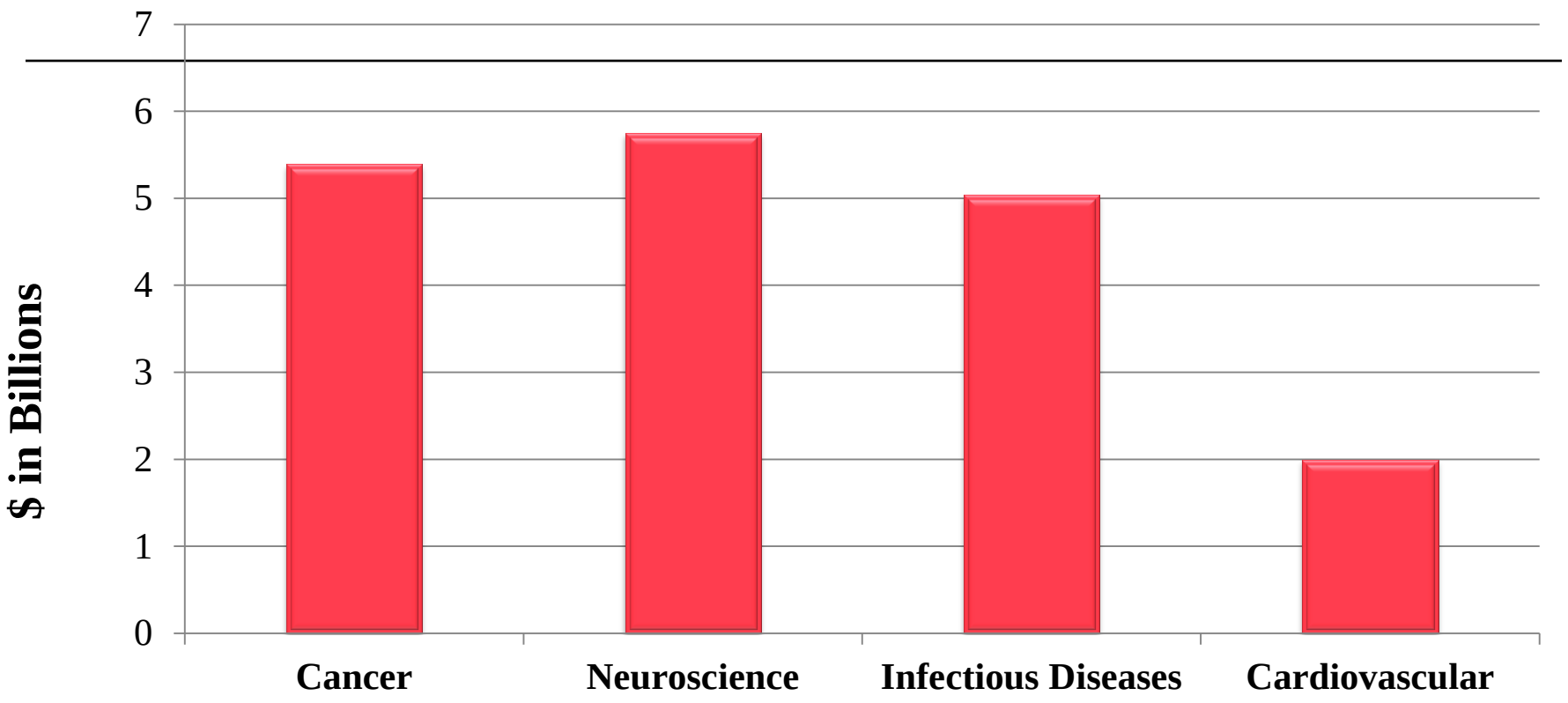
http://www.ninds.nih.gov/about_ninds/plans/NINDS_strategic_plan.htm

Neuroscience is attracting the best and brightest



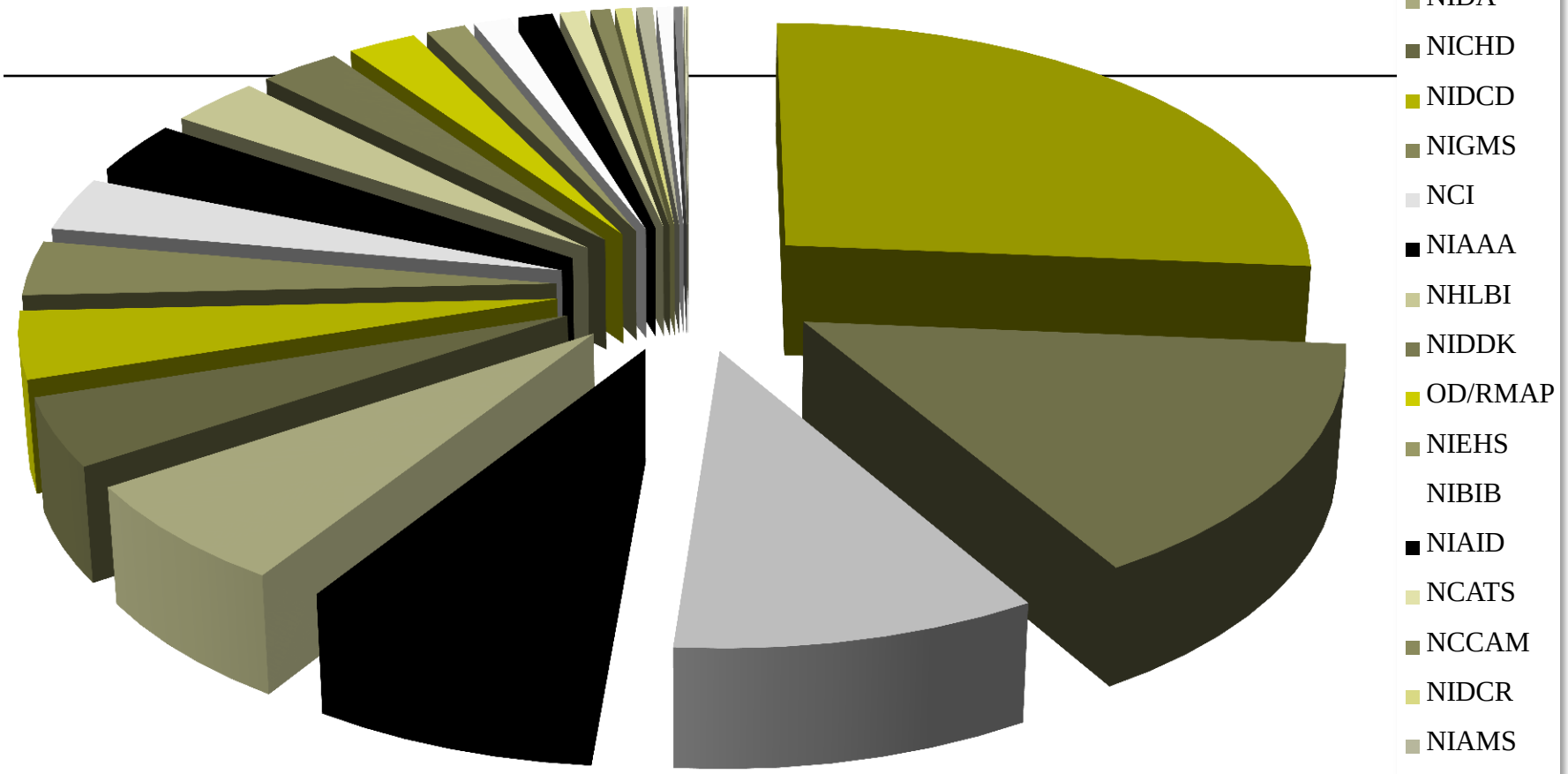
http://report.nih.gov/NIHDatabook/Charts/Default.aspx?showm=Y&chartId=267&catId=21

2015 NIH Funding of Disease Categories



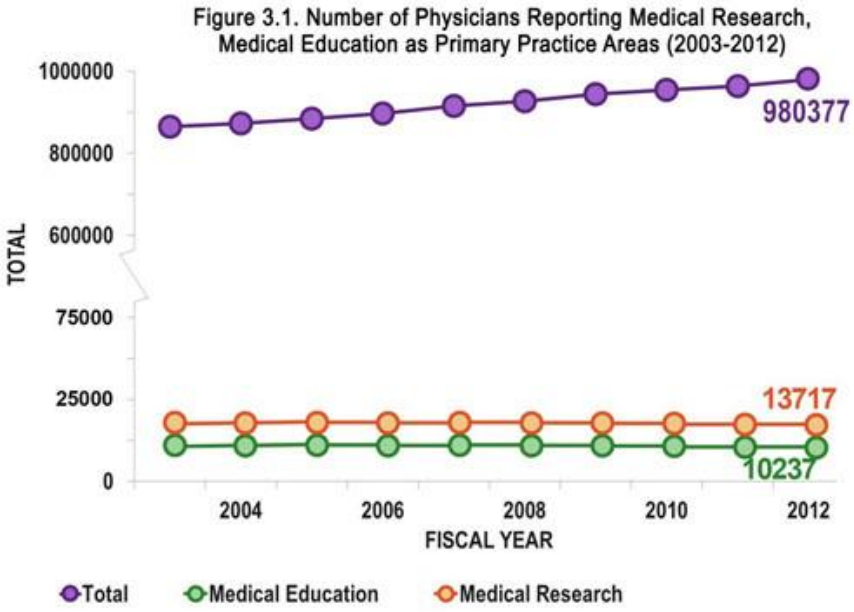
The Era of the Brain

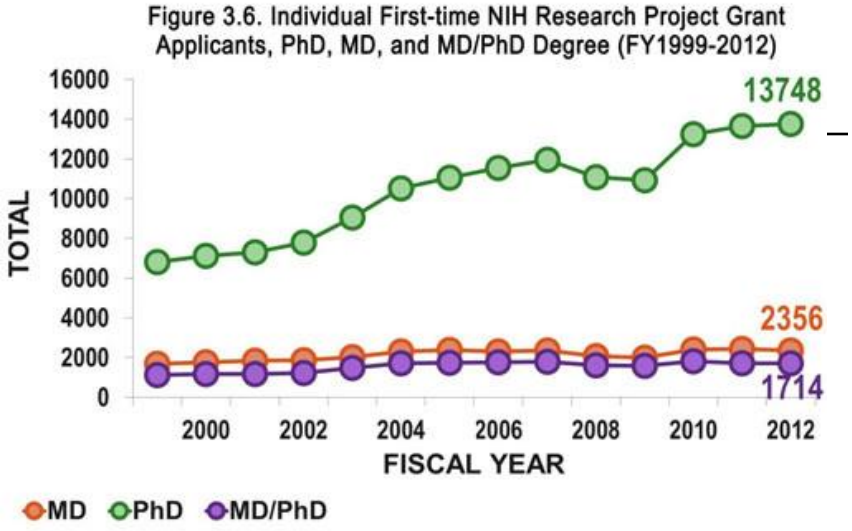
NIH Support for Neuroscience Extends across Many Institutes

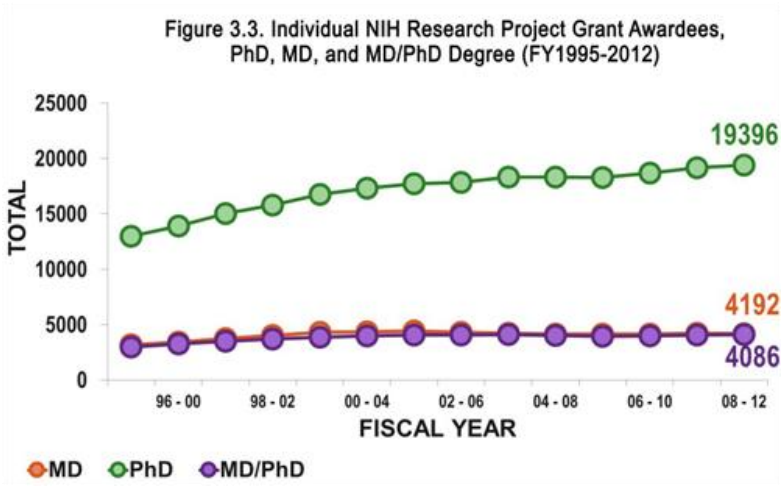


RCDC reporting - ($$$ in billions)

Number of Physicians in Research Careers Remains Flat







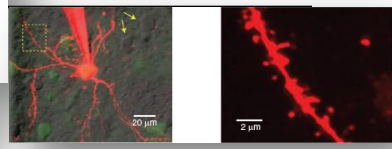
Real Breakthroughs Depend on Arsenal of Basic Science Tools and Knowledge

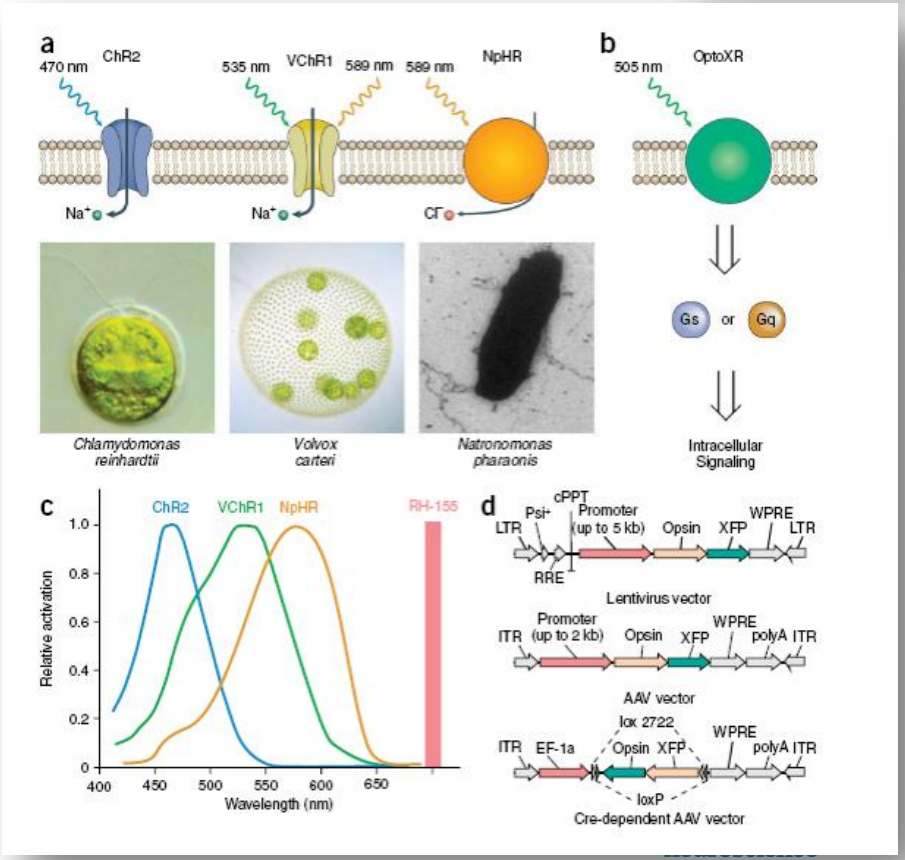
Light-activation of brain circuits via Optogenetics

Competitive regulation of synaptic Ca^{2+} influx by D2 dopamine and A2A adenosine receptors

Michael J Higley[1,2] & Bernardo L Sabatini[1]

nature neuroscience





Parvalbumin neurons and gamma rhythms enhance cortical circuit performance

Vikaas S. Sohal[1]*, Feng Zhang[1]*, Ofer Yizhar[1] & Karl Deisseroth[1]

nature

Optical Deconstruction of Parkinsonian Neural Circuitry

Science

Viviana Gradinaru,[1,2]* Murtaza Mogri,[1]* Kimberly R. Thompson,[1] Jaimie M. Henderson,[3] Karl Deisseroth[1,4]†

Light-Induced Rescue of Breathing after Spinal Cord Injury

J. Neuroscience

Warren J. Alilain,[1] Xiang Li,[1] Kevin P. Horn,[1] Rishi Dhingra,[2] Thomas E. Dick,[1,2] Stefan Herlitze,[1] and Jerry Silver[1]

[1]Department of Neurosciences and [2]Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Medicine, Case Western Reserve University School of Medicine, Cleveland, Ohio 44106

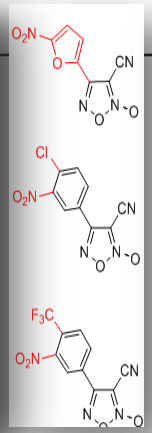
Channelrhodopsin-2–assisted circuit mapping of long-range callosal projections

nature neuroscience

Leopoldo Petreanu, Daniel Huber, Aleksander Sobczyk & Karel Svoboda

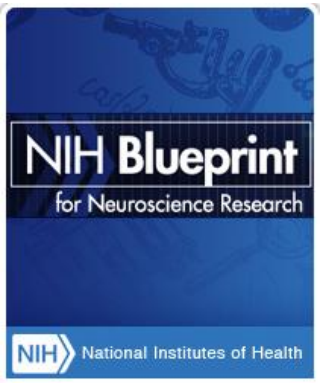
NINDS Is Investing Across the Research Spectrum

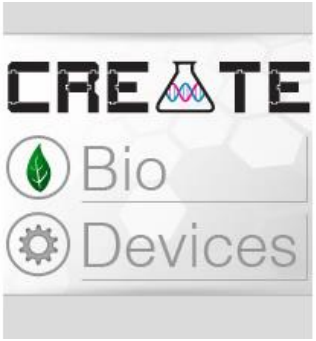





Basic Research	Disease-focused research	Target ID	Assay Dev.	High Thru-put Screen	Pre-Clinical	FDA IND	Ph. I	Ph. II	Ph. III	FDA Re-view	Clinic

NINDS Office of Translational Research





- Goal – advance promising therapies to hand off to biotech/pharma companies
  - Innovation Grants to Nurture Initial Translational Efforts (IGNITE)
    - Early-stage therapy development
    - Four separate opportunities from assay development to platform technology development
  - Blueprint Neurotherapeutics Network (BPN) for small molecules
    - Development of small molecules
    - Provides investigators with access to consultants and contracts that provide discovery, preclinical development, and clinical trial support
  - Cooperative Research to Enable and Advance Translational Enterprises (CREATE) Bio and Devices
    - Development of biologics (including proteins, peptides, nucleic acids, gene and cell therapies)
    - Development of devices (including implants, stents, and prosthetics)
- These programs:
  - Are milestone driven
  - Offer multiple entry points and seamless path of support across the therapy development pipeline

http://www.ninds.nih.gov/funding/areas/translational_research/

"The Next Great American Project"

"So there is this enormous mystery waiting to be unlocked, and the BRAIN Initiative will change that by **giving scientists the tools they need to get a dynamic picture of the brain in action** and better understand how we think and how we learn and how we remember. And that knowledge could be – will be – transformative."

~President Obama, April 2, 2013

It's All About BRAIN Circuits!


Image: *USA Today*

The Washington Post

April 21, 2015: Anyone who has studied sports science knows that behind athletic confidence is conditioning, not just in the fitness sense but also in the **neurological one.**

Repetitive physical excellence is a **matter of neuro-plasticity, of training the brain** to message the muscles to perform precise movements with consistency

What no one can know is whether **Tebow's great experiment in neurology** worked

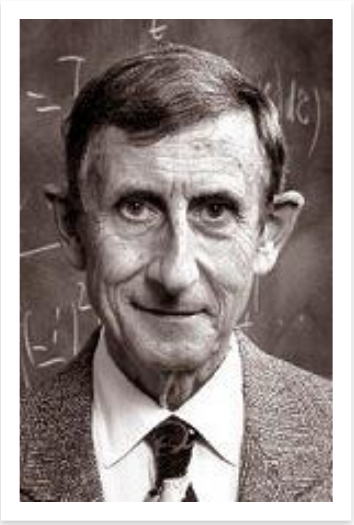
The Challenge for the 21st Century

- **Brain disorders** – both neurodevelopmental and neurodegenerative – will be the most disabling and most costly of the chronic diseases—they will be in the 21st century what infectious diseases were in the 20th century.

- **We do NOT know enough about how brain circuits function and how they dysfunction to cause disability for persons with neuro/mental/substance abuse disorders.**

Where Does Scientific Progress Come From?

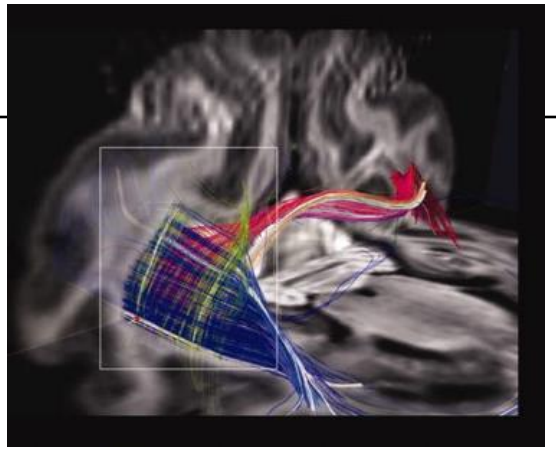
"**New directions in science are launched by new tools much more often than by new concepts.** The effect of a concept-driven revolution is to explain old things in new ways. The effect of a tool-driven revolution is to discover new things that have to be explained."



Freeman Dyson (1997) *Imagined Worlds*
Harvard University Press, Cambridge, MA

The Science Is Ready

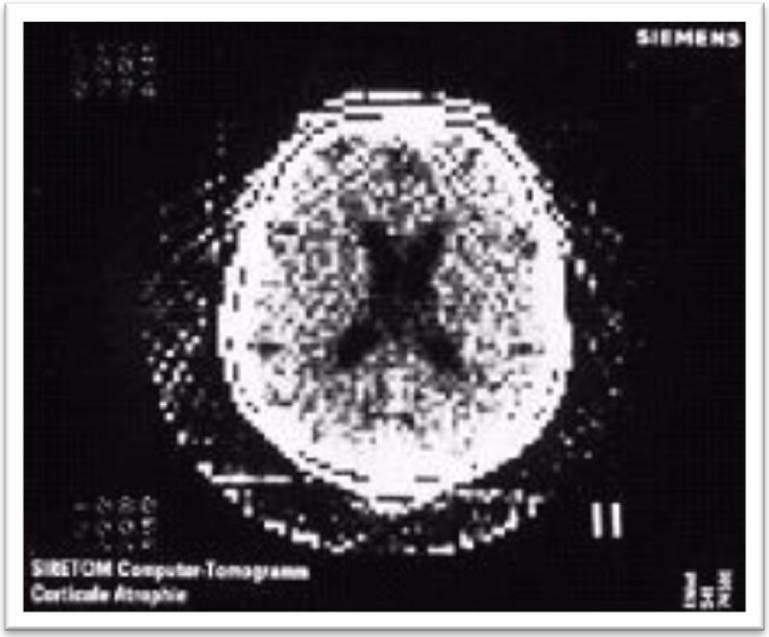
- Progress in neuroscience is yielding new insights into brain **structure** & **function**

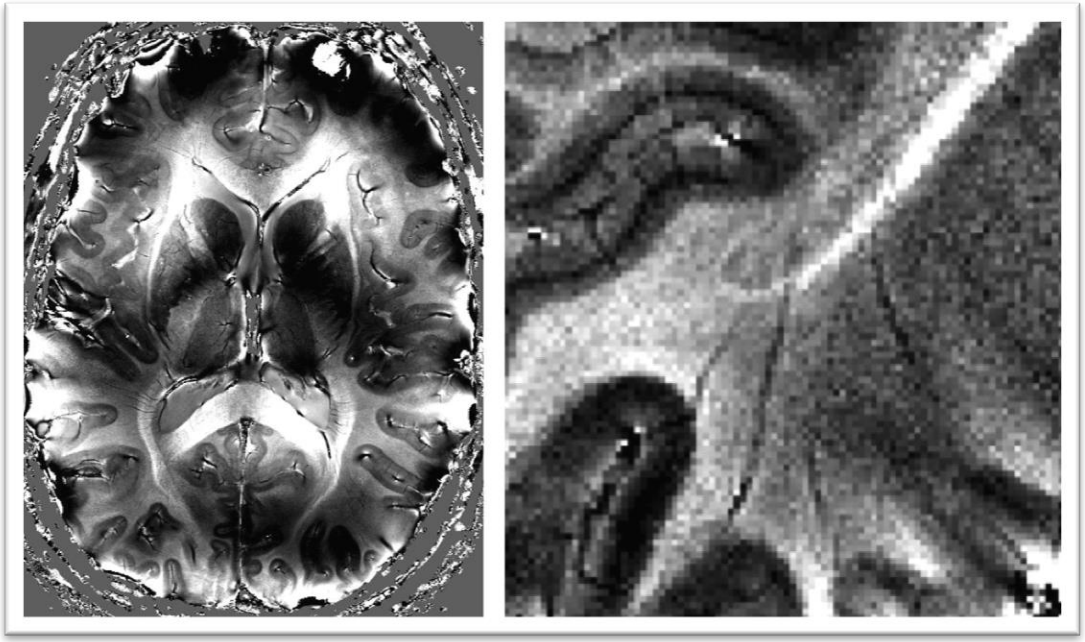


- Progress in optics, genetics, nanotechnology, informatics, etc. is rapidly advancing the design of new tools

What Is Next?

1974 **2012**

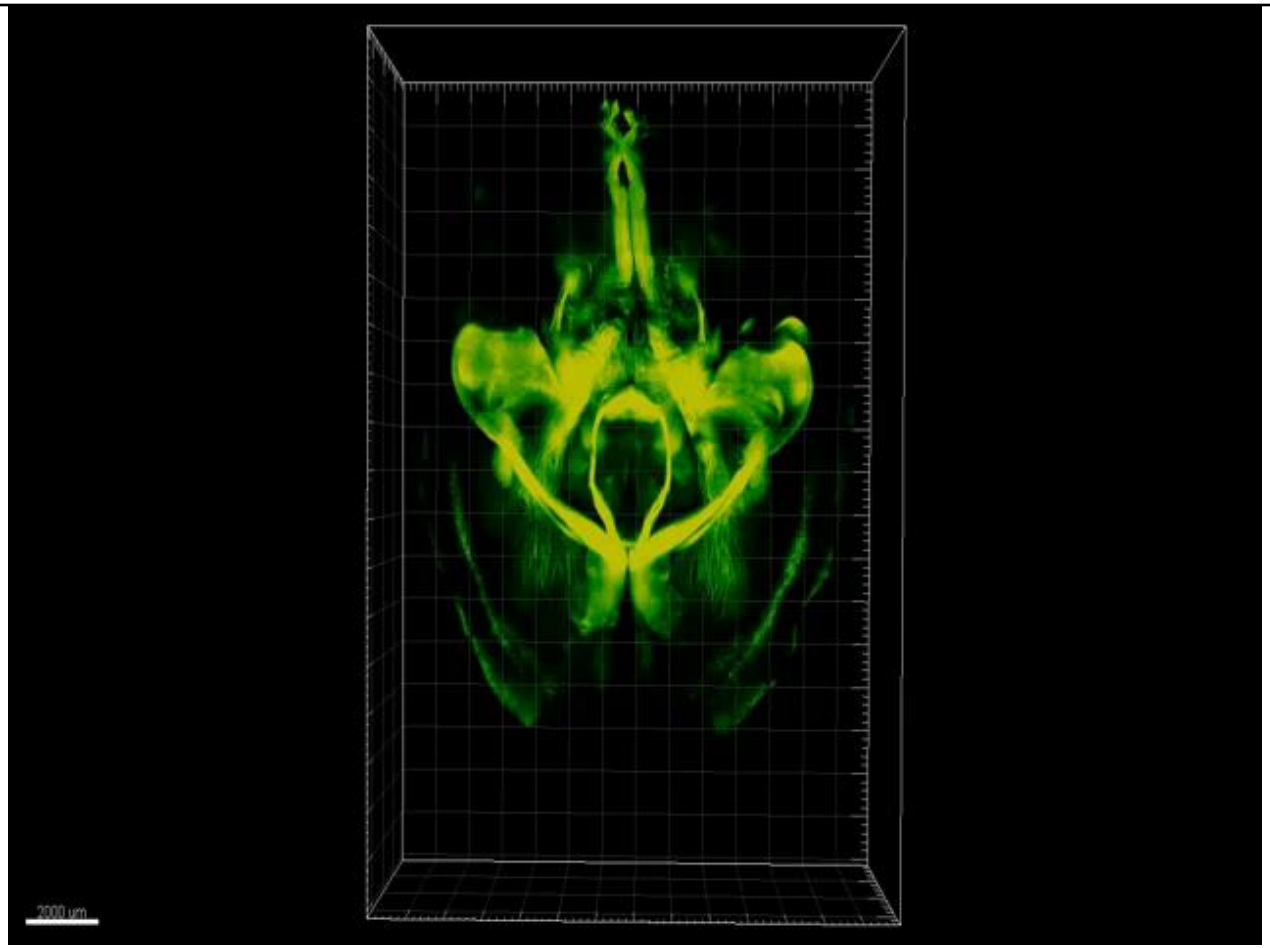




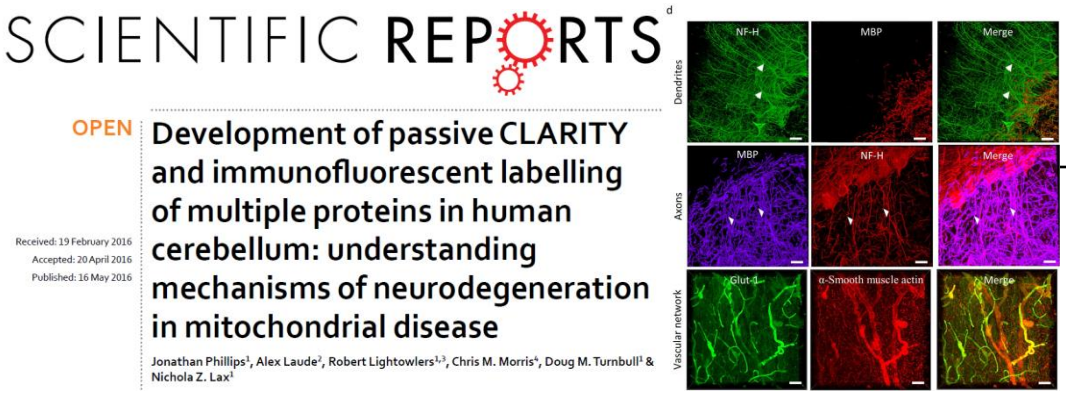
Original axial CT image form Siretom CT scanner circa 1975. Physicians were fascinated by the ability to see the brain and ventricles for the first time.

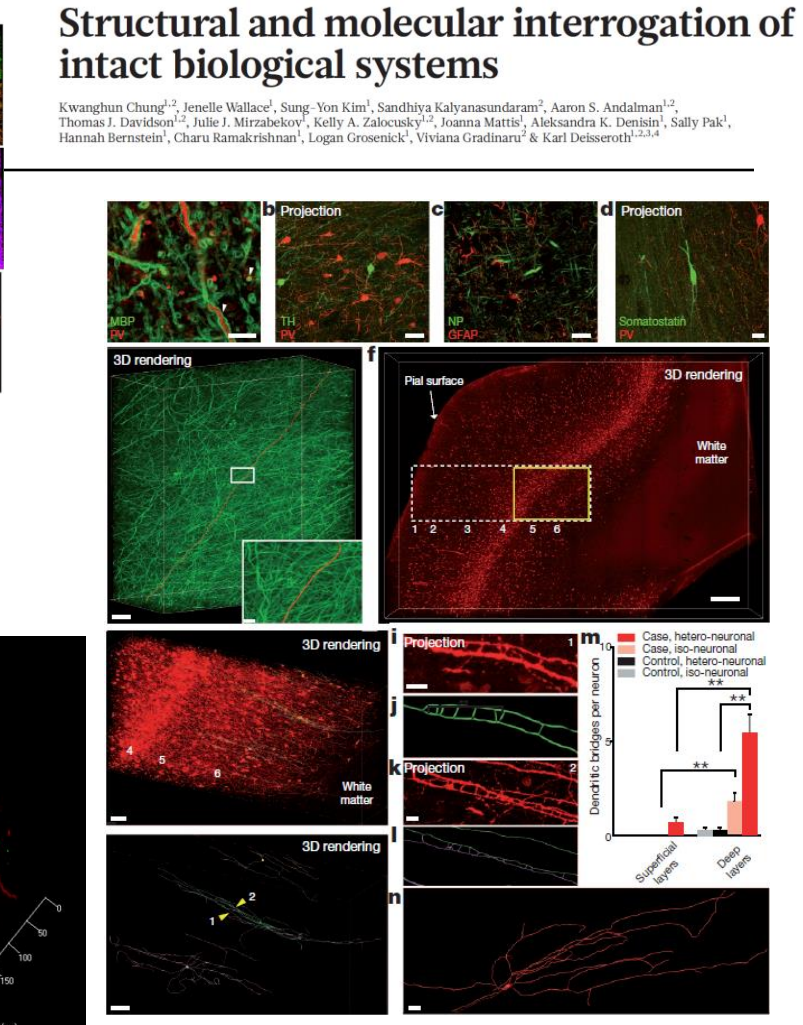
35T susceptibility MRI imaging.
Jeff Duyn, NIH

Tremendous Progress in Defining Structure of Connections.



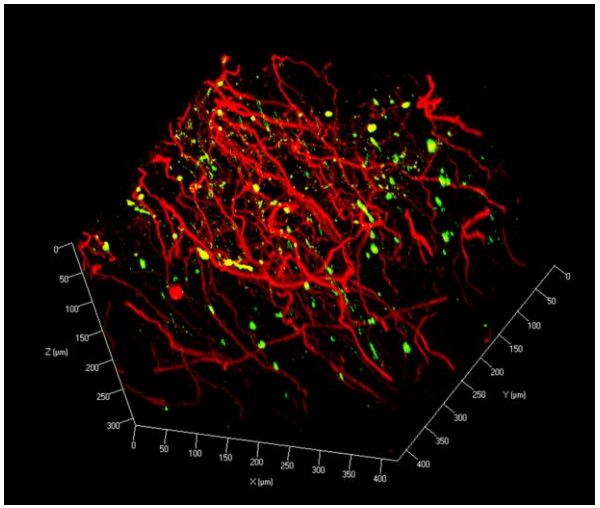
Brain





Neuropathology and Applied Neurobiology Bringing CLARITY to the human brain: visualization of Lewy pathology in three dimensions Liu AK, Hurry ME, Ng OT, DeFelice J, Lai HM, Pearce RK, Wong GT, Chang RC, Gentleman SM.

Z-stack image of double immunofluorescence with anti-αSN (green) and anti-TH (red) antibodies on human midbrain block (z-stack step size 1.5 μm)

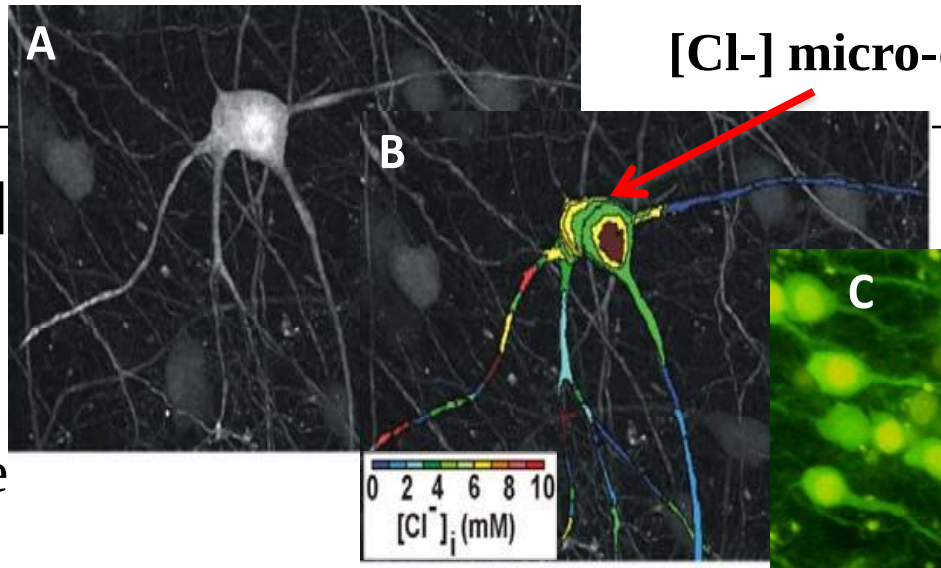


Neuropathology and Applied Neurobiology
7 DEC 2015 DOI: 10.1111/nan.12293

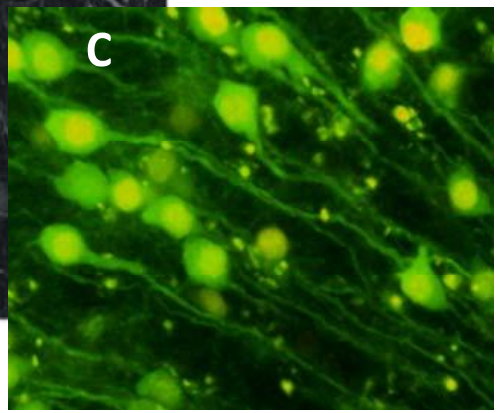
Chemistry in BRAIN: Mapping Chloride Channels

Dr. Kevin Staley

- Chloride ion concentrations [Cl-] modulate cellular activity
  - Synaptic GABA receptors mediate changes in [Cl-]



[Cl-] micro-domains



– Current imaging techniques <u>do not</u> capture [Cl-]
  - [Cl-] varies minutely in micro-domains when GABA receptors activate

– **Super Clomeleon** is a ratiometric chloride-sensitive fluorophore
  - Fused to intracellular and extracellular components of specific GABA receptors
  - Changes in fluorescence intensity depict changes in [Cl-]

– In **BRAIN**: Staley's group will assess fluorescence sensitivity and gain to [Cl-], pH at physiological levels to further optimize Clomeleon

Chemistry in BRAIN: Tracking Dopamine with Diamond-Coated Electrodes

Dr. Kendall Lee, Mayo Clinic

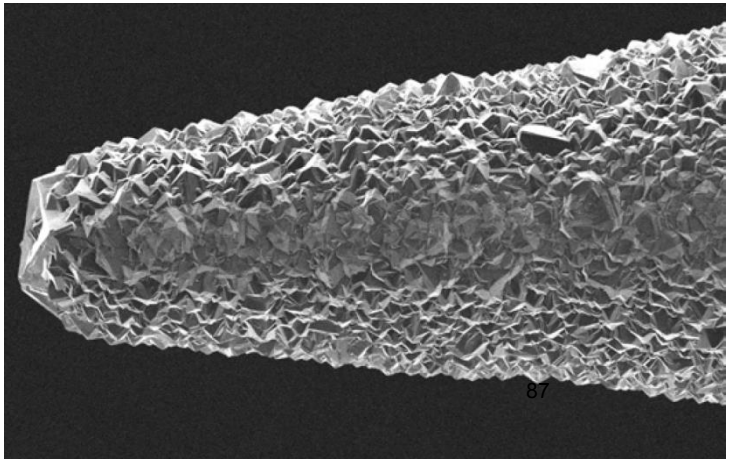
Background

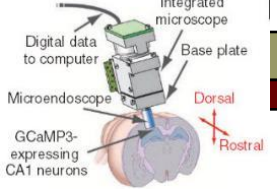
•Deep Brain Stimulation (DBS)—an effective intervention for motor disorders such as Parkinson's—is thought to be mediated by the release of dopamine, but the mechanism is poorly understood

•Studying the flow of neurotransmitters (NT) such as dopamine can be done in real time using fast-scan cyclic voltammetry (FSCV)

BRAIN Goals

- Overcome electrode degradation that occurs with prolonged implantation of carbon fiber-based FSCV electrodes
  - Create highly durable, yet sensitive, polycrystalline diamond film-based electrodes
- Modify FSCV to measure absolute, not relative, NT concentrations





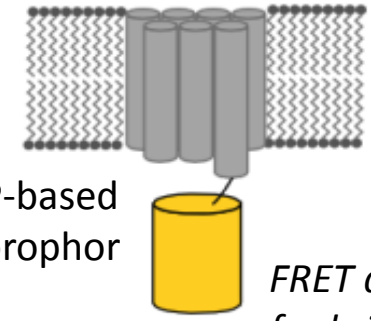
Probe Development

***Sensors*: voltage, transmitters/modulators, activity history, activated synapses, MRI for calcium**

***Activators/inhibitors*: chemical-genetic, photo-switchable ligands, GPCR signaling, synaptic plasticity**

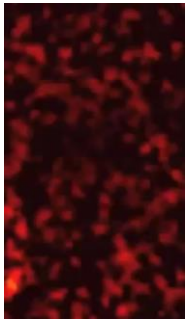
Mutated Opsin

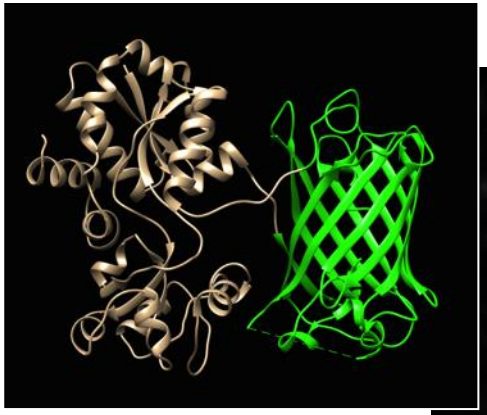
Fast response to voltage changes



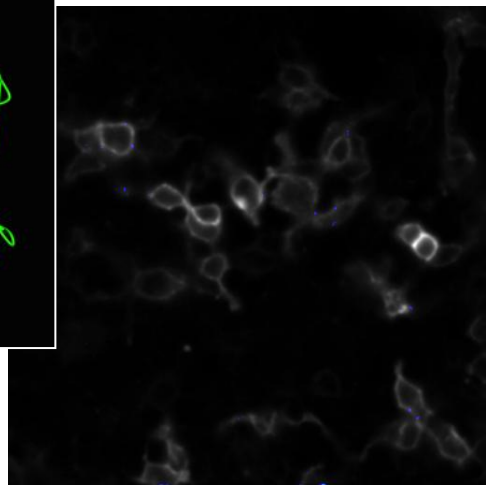
GFP-based fluorophor

FRET donor for bright signal





GFP Linked bacterial protein mutated to bind serotonin



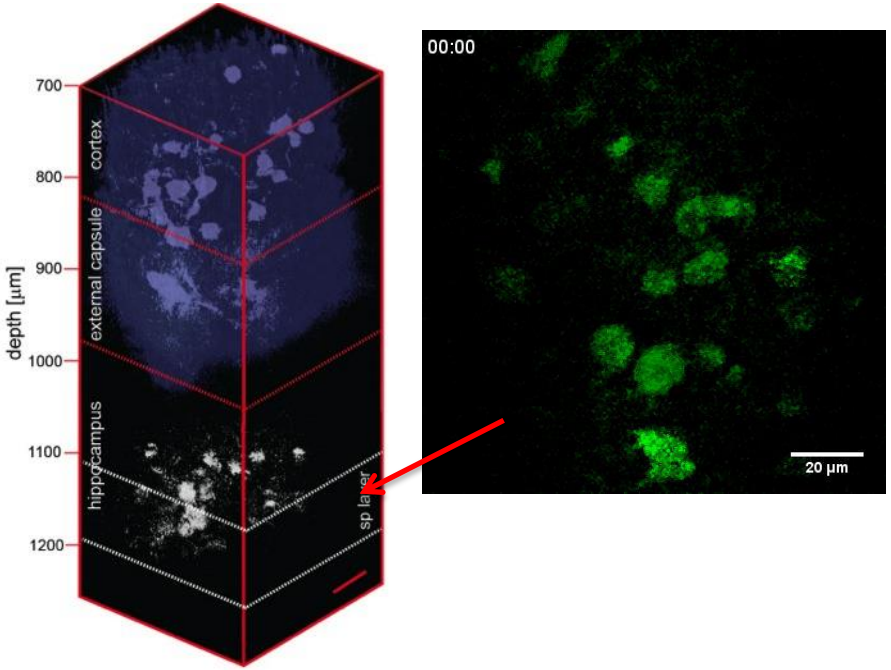
Voltage imaging of single neuron dynamics in mouse cortex in vivo – *Stanford (Schnitzer/Lin)*

New optogenetic serotonin sensor with high SNR in cultured cells – *UC Davis (Tian)*

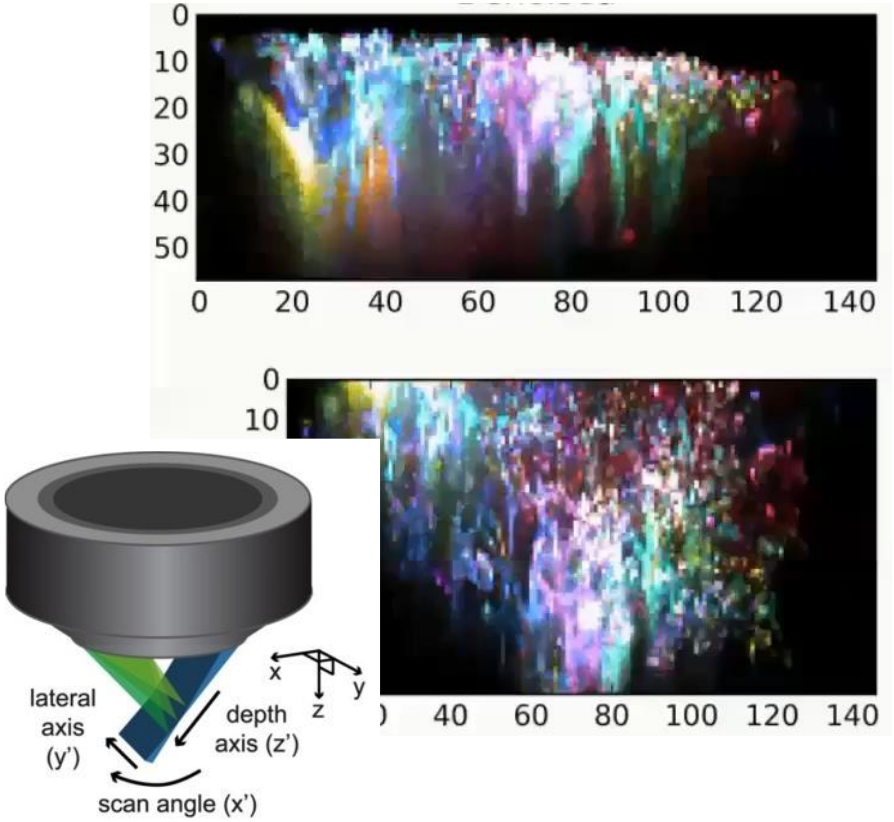
Deeper – anywhere in the brain

Faster – whole volumes rather than single image plane

More precise targeting

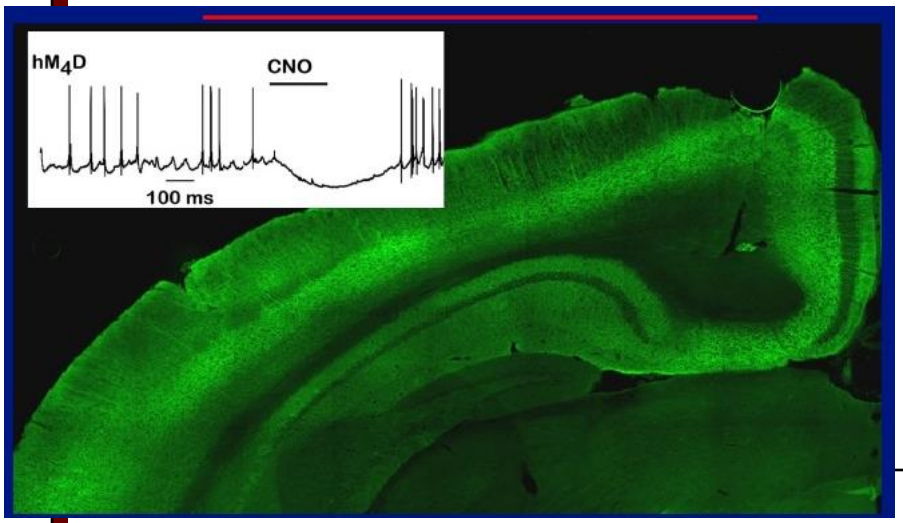


3-photon imaging of hippocampal neurons >1mm deep in the mouse brain – *Cornell (Xu)*



SCAPE imaging of cortical neurons colored by deconvolution – *Columbia (Hillman, Paninski)*

DREADD: Designer Receptors Exclusively Activated by Designer Drugs



Courtesy of Brian Roth, UNC

- "Chemogenetics" - allows modulation of firing rates of specific neuronal groups induced to express an engineered receptor that is activate only by administering a drug (systemically).
- Recent publication: Improved social behavior in animal model of autism seen with increased firing of oxytocin-producing neurons in hypothalamus
- BRAIN investigators currently identifying more sensitive compounds that selectively stimulate the DREADD receptor
- Ultimately, DREADDs activated by different ligands will allow much more complex interrogation of neuronal circuits

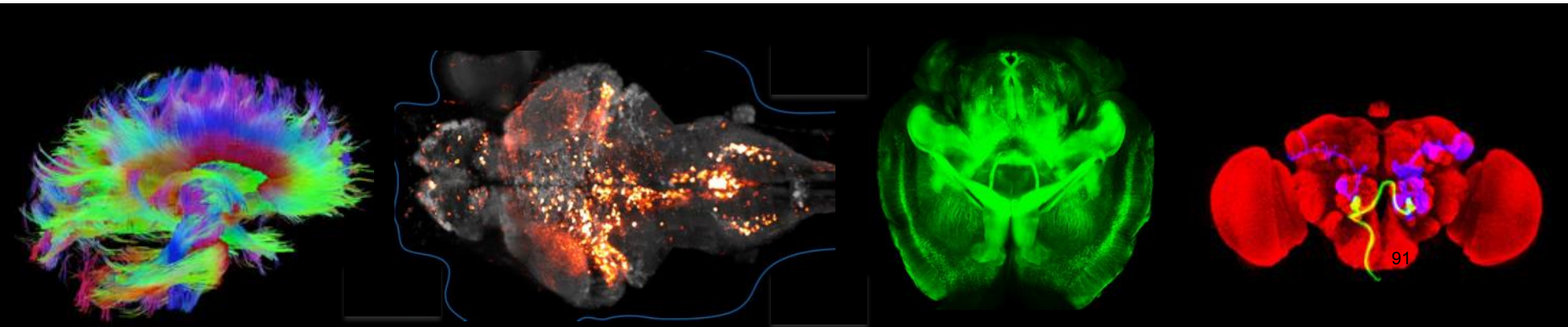
The BRAIN Initiative℠: A Focus on Circuits and Networks

The disability that patients with neuro/mental/substance abuse disorders suffer is a direct result of disordered brain circuits.

We need to be able to see the circuits in action to:

- Determine how to therapeutically modulate brain activity
- Understand how the brain forms memories and how this changes in Alzheimer's Disease
- Improve motor control in Parkinson's Disease
- Target rehabilitation therapy to improve recovery after brain injury

Goal: do this with the precision of individual circuits and at the speed of thought.



Advice: Live your dream!

- Never give up, never surrender.

Career Development for Clinician-Scientists at NINDS: Where do you go from here and how do you get there?

MD/PHD student workshop
June 25, 2016

Stephen Korn, Ph.D.
Director, Office of Training and Career Development and Workforce Diversity
NINDS, NIH

1. Why it's a good time for "young" clinician-scientist investigators
    a. Policies
    b. Data

2. The Review Process

3. Thoughts: What does it take and what are the realities out there.

What you may know already

- Great time to be in science
- If you're really passionate about science, it's a great life
- You can make a huge difference by combining IMPORTANT research with clinical work

In other words:

You can have a huge impact on future patients, and it's a lot of fun too.

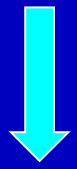
What you may not realize

NIH in general, and NINDS specifically, are committed to helping you succeed in becoming a physician-scientist

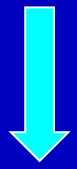
- Grant mechanisms for all stages
- Creating research opportunities
- Workshops
- Career guidance
- Working with Chairs, Institutions and Societies

The Generic Funding Path

Resident, Fellow: F32, R25, NIH Supplements, private



Junior Faculty: Career Dev. (K08/K23/K99), private



Faculty: Independent Award (K02, R-series, others)

At appropriate time: Loan Repayment Program

If you want to do research

- Choose a residency that WANTS you to do research
- Choose a residency that WILL FUND you to do research

NINDS: R25 for residents and fellows in Neurology, Neurosurgery, Neuropath., Neuroradiol. and Emergency Medicine

NIMH: R25 for residents in Psychiatry

Other ICs: Admin. Supplements or other mechanisms

NINDS R25: ~25 residencies

Mission: Fast-track to K Award

(2009-2016)

Total residents supported:	202
Neurologists:	109
Neurosurgeons:	67
Pediatric Neurol.:	20
Neuropathologists:	6
# switched R25 institutions:	6

NIH policies and practices continue to facilitate the success of early stage investigators

Over 1000 MD/PHD students funded each year from institutional NIH grants (T32)

Fellowship Application Success Rates

	2015		
	NIH	NINDS	NIMH
F30/F31 (MD/PHD)	35%	24%	36%
F31 (PhD predoc)	25%	24%	20%
F32 (postdoc)	25%	27%	21%

NIH-wide Career (K) Awards

Application Success Rate						
	2015	2014	2010	2009	2008	2003
K08	40%	40%	44%	47%	44%	47%
K23	35%	38%	38%	44%	38%	42%
K24	48%	49%	61%	47%	51%	45%
K99	22%	22%	25%	29%	23%	N/A

NIMH K01: 2015: 36% ; 2005: 30%

NINDS K Award Applicant Success Rate (2012-2016)

	MD/PhD	MD
K08	48%	44%
K23	50%	32%

Definitions

New Investigator (NI) is somebody who has not had an R01 or equivalent NIH grant

Early Stage Investigator (ESI) is somebody who is within 10 years of terminal degree or clinical training

ESI/NI Benefit at NINDS

	%tile funded or considered for funding (R01 only)		
	Established		NI/ESI
2007	9		>25
2008	10		>25
2009	11		20 / 30
2010	13		20 / 30
2011	14		20 / 30
2012	15		Up to 25
2013 - 2015	14		Up to 20-25

Effect of ESI/NI Benefit on Time to R01

	Time to First R01	
	From Start of K Award	
	2003-2007	2008-2011
K08	6.3 ± 0.4 (46)	4.9 ± 0.2 (34)
K23	6.5 ± 0.5 (22)	4.5 ± 0.3 (22)

What does that mean

Most common clinician-scientist path: K08/K23 to R01

- K08/K23 is a 5 year award
- Average time from beginning of K to R01 is ~5 years
- This works

2011-2012 Applicant Success Rate (%) Single-PI R01s at NINDS			
	MD	MD/PHD	PHD
Total	25	26	20
ESI	32	38	27
Non-ESI	23	22	18
NI	24	24	20
Non-NI	26	27	20

Time to R01 - The Math

Progression of MD-PHDs (example)		
Duration (yrs)	Age (yrs)	Start what
Start	22	School
+8	30	Residency
+4	34	Fellowship
+2	36	K award
+5	41	R01

Some added reality

Time (months) from End of Residency to K Award (K award made FY 2009 – 2016)

	All Applicants	**MD Only**	**MD/PHD**
K08	54.4 ± 2.9 (123)	69.0 ± 5.4 (51)	44.1 ± 2.4 (72)
K23	62.6 ± 2.8 (80)	67.4 ± 3.0 (63)	44.6 ± 5.8 (17)

With a 4 year residency, puts start of R01 at age 43 for an MD/PHD, 41 for an MD

Through changes in the review process, implemented in January 2016, coupled with the R25 program, NINDS is trying to shorten the time from residency to K by 2-3 years for those with outstanding pre-residency research experience.

NINDS clinician K to R transition

For K awards terminating 2003-2011

- 41% of all K08s/K23s got R01s
- 55% of all K08s/K23s that tried got R01s
- 75% of all K08s/K23s have independent funding

Analysis in 2012

NINDS clinician K careers

For K awards terminating 2003-2008

Currently in Academic Position

K08s: 86% K23s: 88%

Published between 2010-May 2012

K08s: 88% K23s: 85%

In Academic Position and Published…

K08s: 95% K23s: 96%

Analysis in 2012

Conclusion
Clinician-Scientists are doing very well

Enough Data!

First Steps to Success

The tough part is putting yourself in a position to get a K in a timely manner

FOLLOW YOUR PASSION

NIH will fund "any" excellent basic or clinical biomedical science (somewhat depends on NIH institute)

1. NIH doesn't hate worms, flies, clinical research, basic research, physicians, neurologists…
2. Research doesn't have to be translational

BUT…

Take advantage of the fact that you're a clinician

HAVE A LONG-RANGE PLAN

- Where are you going and how are you going to get there
- Keep your eyes on the target and your progress
- Be proactive
- Do important work

You need a good project that will get you to a K. Don't intentionally put time into things that have no future unless there's a very good reason

Reviews and case reports will not help your application in review

Get an outstanding mentor, and be an outstanding mentee!

Funding Mechanisms

National Institutes of Health

- 27 Institutes or Centers (ICs)
- Each IC has its own mission
- Each IC has its own budget
- Each IC has its own activities
- Each IC has its own ways of doing things
- Each IC has its own personality

When you're planning to submit a grant, check with program directors from different institutes to determine their specific policies and interest in your science.

Funding for Fellows (already mentioned)

R25 – if in residency with award
T32 – dep. on research area/institution
F32 – need to plan in advance
Private foundations
Funded investigator grant

Career Development Awards (Ks)

- 5 years
- Generally post-fellowship
- provide salary, fringe, research costs
- **protected time** (most require 75% effort devoted to research)

Details for all mechanisms vary by IC

K99/R00

Must have less than 4 yrs. postdoctoral research experience

- 2 years K99 (mentored)
  - 75% effort required
  - Salary and research costs (IC-specific)

- 3 years R00 (independent)
  - must have tenure track or equivalent position
  - must get appropriate startup package
  - 75% effort on research required
  - $249,000 total cost

All career development awards other than the K99/R00 are open only to U.S. Citizens and permanent residents

Loan Repayment Program (LRP)

Clinical Research
Pediatric Research
Health Disparities Research
Contraception and Infertility
Clinical Research by Diverse Indiv.

NINDS primarily supports clinicians

Alphabet soup of grant mechanisms once you reach independence

- R01, DP2, P01, R21, R03, STTR/SBIR
- Many more
- you need to identify what's appropriate for you from institute and NIH websites

And NIH is not the only game in town

Some things to keep in mind while heading towards a K

- Choose lab/mentor/environment well
- Make sure you get outstanding mentoring, and that you are an outstanding mentee – do not underestimate its importance
- It's critical that you publish… and have some good first author publications
- Focus on high quality publications
- Devote enough time to crafting your grant – the bar is high, as it should be. GET GOOD HELP

Do this with the right intentions!

Be smart about your choices (well, at least be aware of what you're choosing!)

The Review Process

Electronic submission is unforgiving

1. You must be on time and get it right

2. Your institution submits it, but it's your application – be early and check on it

It is not uncommon for grants to be rejected by CSR because incomplete

i.e. It is your responsibility. Take control.

For NIH or anywhere else, your grant application will be reviewed by:

- Experts
- Non-experts
- People who are reading lots of grants
- People who want to be excited by science
- People who will be irritated by a sloppy application

Submit a high quality application!

Have people review your application critically
WELL BEFORE submission

All parts of any grant application need to be excellent

- Get help from the right people
- Spend enough time to make it great (hint: it will take you months)

Hypothesis-Driven vs. Discovery Science

(Fishing vs Trawling)

(If you're going to fish, cast the line into a big lake!)

Write clearly, coherently, logically

Do not be sloppy

DO NOT BE BORING

You may not be funded on the first submission

DO NOT TAKE REJECTION PERSONALLY!

And don’t get frustrated.

PERSIST!

Fix the problems

- You can now resubmit repeatedly. But…
- Understand what will be required for success. What is the summary statement saying?
- Get advice from your NIH program director and others with funding success

Fix the problems

- Don’t be stubborn
- But don’t act like a ping-pong ball
- Get thoughtful advice (hint: not all advice is thoughtful, not all advice is good)
- Speak to an NIH program director in addition to your mentor(s))

Respond appropriately to reviewer comments

PERSIST! If you, your project and your mentor are “good,” you’ll succeed

But Persist Wisely – it isn’t a lottery and you’re entitled to nothing

Enjoy and appreciate it – Grant writing and review make your science better, and you learn a lot from it

Remember to

HAVE FUN
&
HAVE A LIFE

(it’s a choice!)

If you have questions:

Email or Call
(Email is better for first contact)

Program Director - questions related to science

Training Director (e.g. me) - for questions related to mechanisms, application preparation, direction, problems, etc.

korns@ninds.nih.gov

Physician-Scientist: Career and Family: Can You Have it All?

Christina M. Marra, MD
Neurology and Medicine (Infectious Diseases)
University of Washington School of Medicine

Outline

- Sources
- See one, do one, teach one
- Work-life balance
- Life choices
- Practical advice
  - Nonwork
  - Work
- It’s a problem; what is being done
- References

Qualities of a Great Mentor

- Smart
- Accomplished
- Funded
- Committed
  - Explain the system
  - Write an abstract
  - Give a talk
  - Review a manuscript
  - Write a manuscript
  - Write a grant
- Generous

Comments on Choosing a Mentor

- A single mentor may not be optimal
- Identify several role models or mentors
  - Based on attributes or expertise
- Ideally, your mentor should not be your immediate supervisor

Work-Life Balance

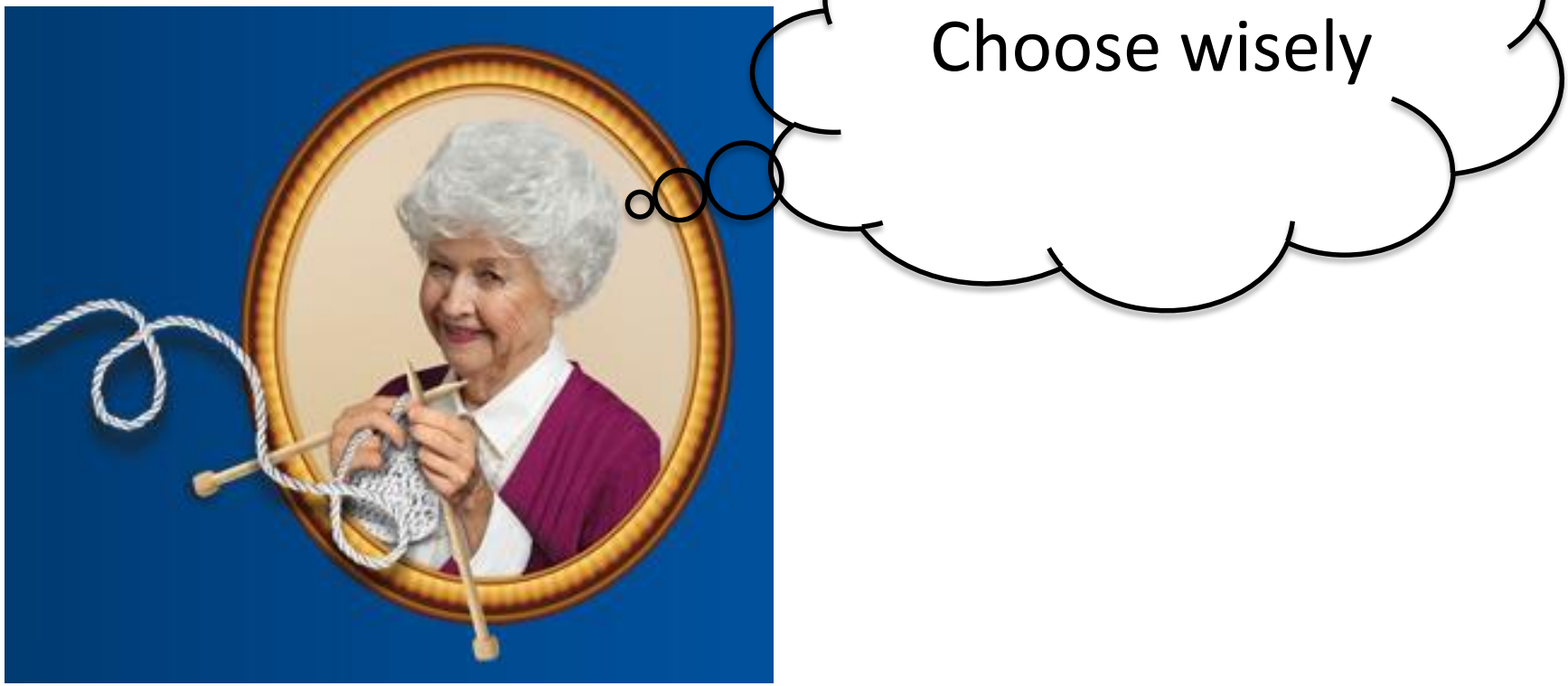
Work-Life Balance

No one on his deathbed ever said “I wish I’d spent more time at the office.” Don’t get me wrong. Work is a wonderful thing. It can be very fulfilling and can provide meaningful service to others. But personal relationships are the most important things in our lives. It’s through relationships with others that we learn about ourselves, about how to make choices, how to self correct, how to grow and develop, how to contribute to the human community, how to turn dreams into reality. –Rodger Duncan

Life Choices: Figure Out Your Priorities

- Jappreet Sethi, LinkedIn
  - What is your focus for the next 5 years?
  - If you could have an extra hour in a day, how would you spend it?
  - Would you be comfortable not spending a lot of time with your kids as they grow up?
  - Are your family members on board with your work-family choices?
  - What gives you the greatest satisfaction, and can you get it at least twice a week?
  - What do you want to be remembered for when you die?

Are your family members on board with your work-family choices?



Understanding the Medical Marriage

- Perlman RL et al. Acad Med 2015;90
  - Interviewed 25 physicians and spouses using appreciative inquiry
    - 12 women
    - 13 men
    - 3 nonphysician spouses

Themes

Theme	Description
We rely on mutual support in our relationships	Reciprocal emotional, mental, occupational support
We recognize the important roles of each family member	Importance of role clarity
We have shared values	Shared values provide foundational structure
We acknowledge the benefits of being a physician to our relationships	Medical and financial security

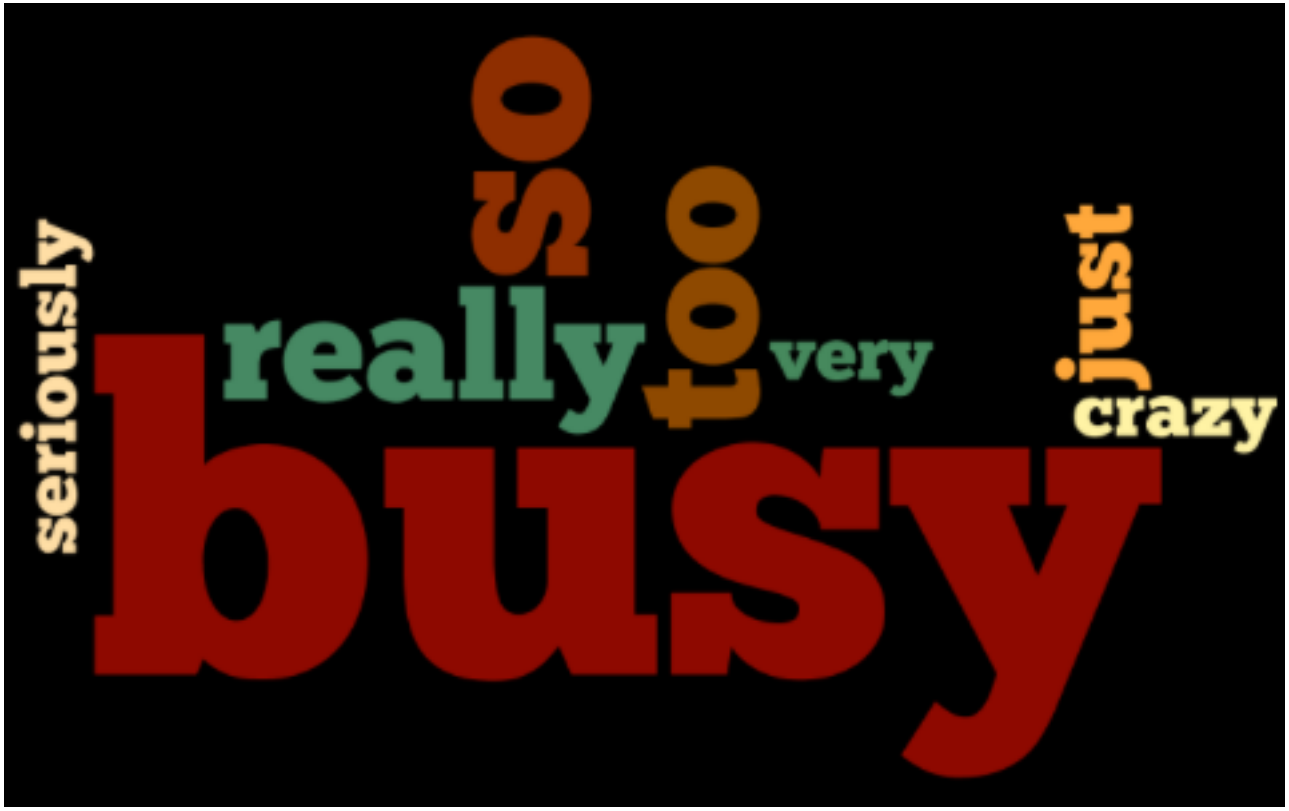
Perlman R. L. et al. Acad Med 2015;90

Priority Setting: a (bad) Example

- Sapey E. Lancet 2015;385 (Suppl 1)
  - "I wrote a list of how I prioritize my time, and it went like this:
    - Children/patients/research
    - Grant and paper writing
    - Husband/collaborators (no particular order)
    - Dog
    - People I barely know or will never meet but who email me (a lot)
    - Me"

Nonwork Practical Advice

- Really good childcare/adultcare
  - Plan ahead for snow days, sick days, teacher conference days
- If all else is equal, consider living near extended family
- Consider your commute
- Early risers…
- Schedule recurring social activities
- Exercise
- When you're away from work, be away
- Appreciate your partner/s
- Outsource the unimportant stuff if you can



Replace “I’m too busy” with
“that’s not important to me right now”

Kim Pisolkar, http://www.huffingtonpost.com

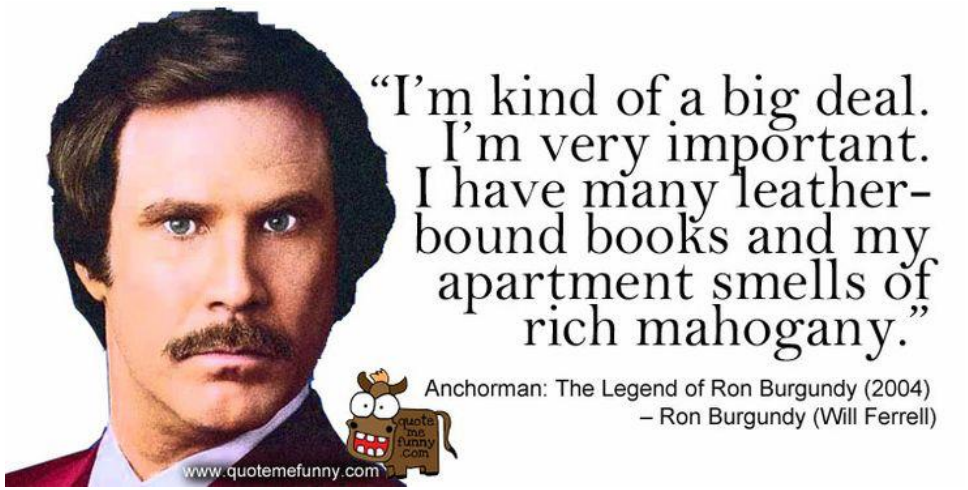
Work Practical Advice

- “Uber organized”
- Take advantage of promotion postponement
- Don’t be intimidated by the success of others
  - Learn from their experiences

Flexibility

- Things are going to change whether you want them to or not
- Avoid
  - Catastrophizing
  - Guilt

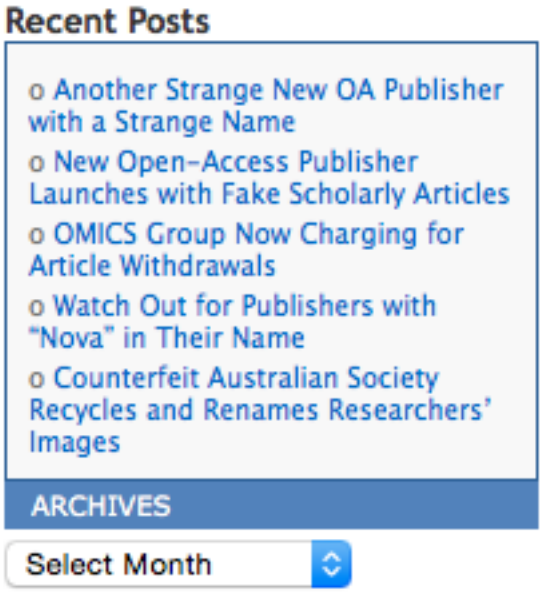
Citizenship



- We are all special
- Humility
  - Respect other people's time
  - Participate in departmental life
- Generosity
  - Students

Say YES

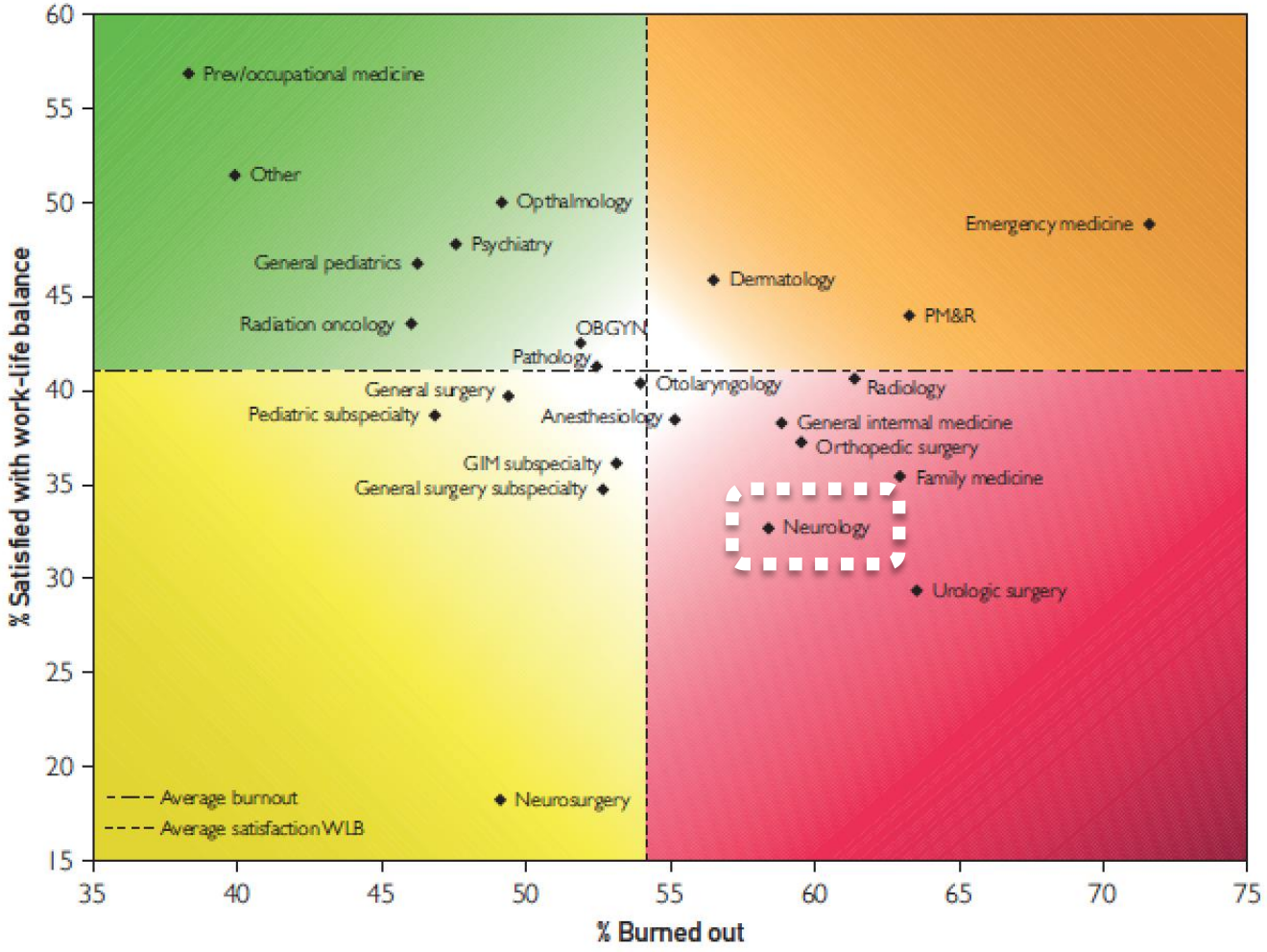
- Is this interesting to me?
- Can I use it again?
- Will it be published/indexed?
  - Avoid predatory publishers: http://scholarlyoa.com/publishers/
- Ask others if unsure
- Say no selectively



Physician Work Life Balance

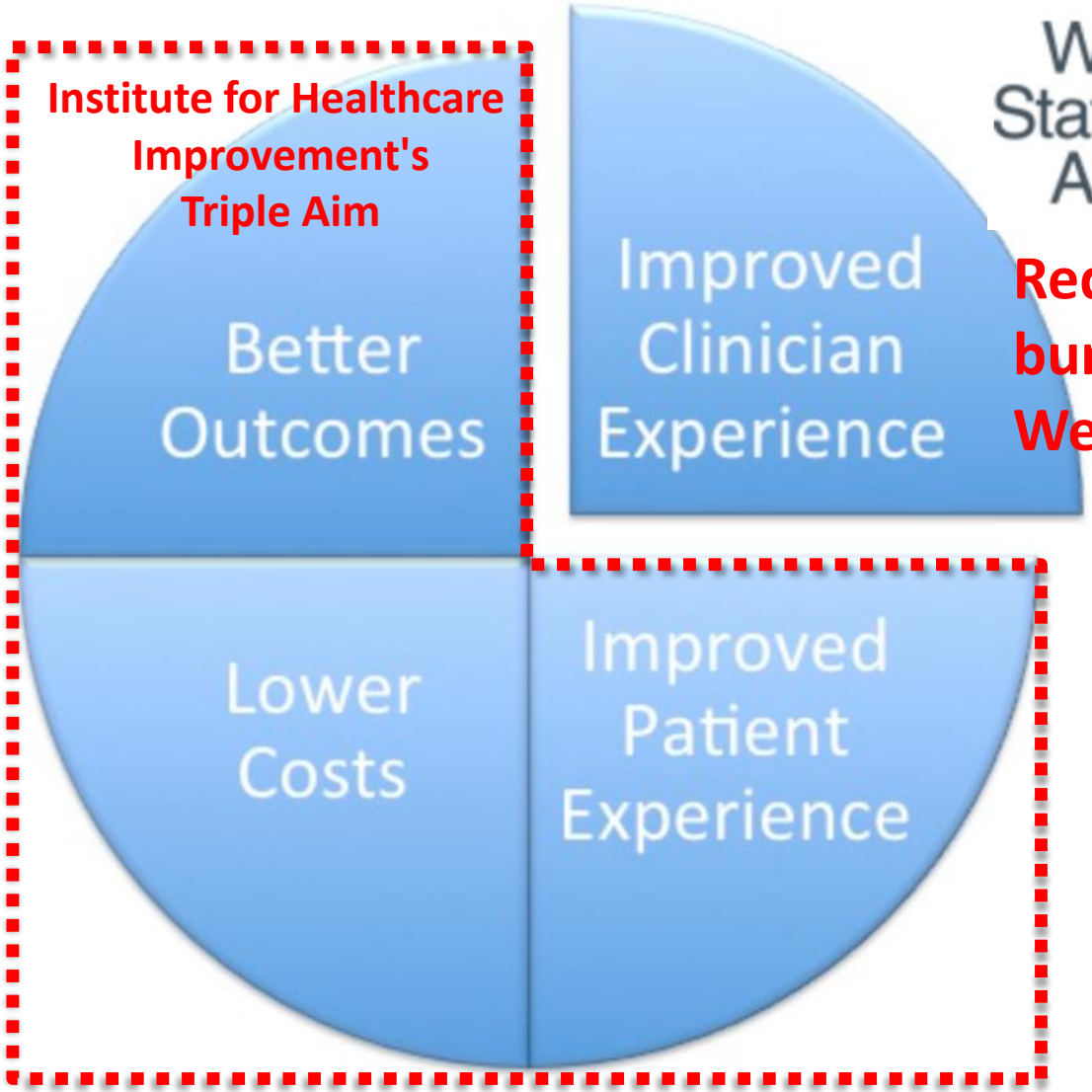
- Shanafelt TD et al. Mayo Clin Proc 2015;90
  - 2014 survey of physicians from AMA Physician Master File
    - Burnout
    - Satisfaction with work life balance
  - 6880 (19%) responded
    - 1625 (24%) at academic medical centers
  - Median age 56 yrs.

Physician Work Life Balance



Shanafelt TD et al. Mayo Clin Proc 2015;90

The Quadruple Aim



Washington State Medical Association | WSMA

Reduce administrative burdens

Wellness Programs

The Takeaway

Shana Lebowitz, Greatist.com

> “The most important thing to remember in the quest for work-life balance is that we’ll never achieve perfection…What matters is that we create a personally meaningful life that helps us feel happy and healthy overall.”

References

- LaVoie MJ. Career building as a neuroscientist at a research hospital. Annals of Neurology 2015;77:367-370.
- Schwingshackl A. The fallacy of chasing after work-life balance. Frontiers in Pediatrics 2014;2:26.
- Surawicz CM. J. Edward Berk distinguished lecture: avoiding burnout: finding balance between work and everything else. The American Journal of Gastroenterology 2014;109:511-514.
- Shanafelt TD et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. Mayo Clin Proc 2015;90:1600-1613.

Overview of NINDS Funding Mechanisms

Research Project, Center Grants, and Cooperative Agreement Awards:

Mechanism – Program	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
R01: Research Project Grant	This program supports a focused research project conducted by a principal investigator. Also supported are *Pilot Clinical Trial Grants for Neurological Disease* to gather preliminary data and conduct clinical studies to support the rationale for a subsequent full-scale clinical trial of intervention to treat or prevent neurological disease.	Prorated based on PI % effort.	Modular up to $250K. NINDS approval for over $500K.	Up to 5 years. May be renewed.
R03: Small Grant Program	This program supports new research projects that: 1) lead to a defined product, resource or "deliverable" that has inherent value to the neuroscience community; 2) will generate an important and potentially publishable unit of information or dataset; or 3) focus on secondary analysis of clinical data sets.	Prorated based on PI % effort.	Modular up to $50K.	Up to 2 years. Not renewable.
R15: Academic Research Enhancement Award	This award provides support for research projects by faculty who are located in health professional schools or other academic components that have not been major recipients of NIH research grant funds.	Prorated based on PI % effort.	Detailed budget up to $300K. (Modular up to $250K.)	Up to 3 years. May be renewed.
R21: Exploratory/ Developmental Grant	This program supports new research projects that: 1) assess the feasibility of a novel avenue of investigation; 2) involve high risk experiments that could lead to a breakthrough in a particular field; or 3) demonstrate the feasibility of new technologies that could have major impact in a specific area.	Prorated based on PI % effort.	Modular up to $275K.	Up to 2 years. Not renewable.
P01: Research Program Project Grant	This program supports broadly based multidisciplinary research programs with a well-defined central research focus or theme. Program projects must have a minimum of 3 interrelated projects that contribute to the program objective, as well as shared resources (Cores).	Prorated based on PI % effort.	Program staff approval for over $500K.	Up to 5 years. May be renewed once.
P30: Center Core Grant	This program supports shared resources and facilities used by investigators with NINDS funded grants. An institution is eligible for a maximum of one NINDS Core Grant. These awards will support basic, translational, and clinical research, but will not be used to support clinical trials or to provide patient services.	Prorated based on PI % effort.	Up to $400K.	Up to 5 years. May be renewed.

P50: Specialized Center Grant	This Center Grant supports any part of the full range of research and development activities comprising a multidisciplinary attack on a specific disease entity or biomedical problem area within the mission of NINDS. Consultation with NINDS Program staff is crucial to the development of a P50 application.	Prorated based on PI % effort.	Program staff approval for over $500K.	Up to 5 years. May be renewed once.
U01: Research Project - Cooperative Agreement	Supports cooperative agreements that will have milestone-driven projects focused on the identification and pre-clinical testing of new therapeutics. This cooperative agreement supports a focused research program conducted by a principal investigator with substantial involvement by NINDS staff in research activities.	Prorated based on PI % effort.	Depends on specific announcement.	Up to 5 years. May be renewed.
U10: Cooperative Clinical Research Grant	This cooperative research grant supports the clinical evaluation of various methods of therapy and/or prevention in specific disease areas. There is substantial involvement by NINDS staff in research activities.	Prorated based on PI % effort.	Depends on specific announcement.	Up to 5 years. May be renewed.
U24: Resource-Related Research Project - Cooperative Agreement	This cooperative agreement aims to improve the capability of resources to serve biomedical research. The project includes substantial involvement of NINDS staff, and may serve a local, regional, or national user group. The project will normally include shared resources, technical expertise, and scientific expertise. Supports cooperative agreements that will have milestone-driven projects focused on the identification and pre-clinical testing of new therapeutics.	Prorated based on PI % effort.	Depends on Specific RFA.	Up to 3 years. May be renewed.
U54: NINDS Cooperative Program in Translational Research	This cooperative agreement supports a specialized center that will have milestone-driven projects focused on the identification and pre-clinical testing of new therapeutics. The program will facilitate review and administration of projects and will accelerate the translation of discoveries in basic research to treatment in the clinic. The center may serve as a regional or national resource for special research purposes.	Prorated based on PI % effort.	Program staff approval for over $500K.	Up to 5 years. May be renewed.
U54: Specialized Center - Cooperative Agreement	This program is designed to augment and strengthen the research capabilities of faculty, students, and fellows at minority institutions by supporting the development of new, and/or the enhancement of ongoing, basic and clinical projects and programs. All projects are milestone driven.	Prorated based on PI % effort.	Up to $1M per year. (basic) Up to $1.5M per year. (clinical)	Up to 5 years. Renewal under administrative consideration.

Research Education Programs

Mechanism – Program	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
R25: NINDS Diversity Research Education Grants in Neuroscience	The National Institute on Neurological Disorders and Stroke (NINDS) Research Education grant is a flexible and specialized mechanism designed to foster the development of neuroscience researchers through creative and innovative educational programs. R25 Education Projects enable grantee organizations to provide research, mentorship and related experiences for undergraduate, graduate and medical students, postdoctoral fellows and other junior scientists to broaden their skills and enhance their career development opportunities. Funding support for the R25 Diversity Education Programs should lead to increased recruitment, mentoring, training and retention of diverse researchers in the scientific and technology workforce. This mechanism of support is not to be used to substitute	Prorated based on the PI % effort. All personnel costs associated with directing, coordinating, administering and implementing the program may not	Up to $250K Direct Costs per year.	Up to 5 years.

	the Ruth L. Kirschstein National Research Service Award training and fellowship mechanisms supported by the NIH.	exceed 25% of the total direct costs in any year of the project.		
R25: Research Education Programs for Residents and Fellows in Neurology, Neurosurgery, Neuropathology and Neuroradiology	These research education grants will create an opportunity for medical residents and fellows to participate in an intensive 9 to 24 months of mentored research education experience during residency and fellowship years. This opportunity will include the necessary training for successful competition for independent mentored research awards and will facilitate the transition from fellow/resident to clinician-scientist. In addition to laboratory research skills, participants in the program will develop the critical skills necessary to design and conduct research experiments and write competitive grant applications.	Participants may be paid salary plus fringe for 80% full-time professional effort (4 days per week during the M-F workweek) for between 6 and 12 months per year plus up to $3000 for travel to a scientific meeting and an NINDS-sponsored workshop.	Up to $10,000 per year is provided to the institution for administrative costs.	9-24 months. Not renewable.
R25: Summer Research Experience Programs	These research education grants provide a high quality research experience for high school and college students during their summer academic break. The NIH expects that such programs will: help attract young students to careers in science; provide opportunities for college students to gain valuable research experience to help prepare them for graduate school. The programs would also contribute to enhancing overall science literacy. (This program at NINDS does not support science teachers.)	Participant costs are based on a maximum 15 weeks. Salary and fringe benefits up to $5,000 per high school student and up to $6,000 per college student. For programs shorter than 15 weeks, these amounts will be prorated accordingly.	Up to $100K Direct Costs per year.	Up to 5 years.

Conference Grants:

Mechanism – Program	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
R13: Conference Grant	This granting program provides support for scientific meetings, conferences, and workshops that are relevant the scientific mission of the NINDS. Support of these meetings is contingent on the interests and priorities of the NINDS.	May request partial salary for PI and other staff.	No limit, but typically in the range of $10K-	Up to 5 years, but generally 1 year. May be

	Consultation with Program staff and subsequent letter of intent is essential to the development of an R13 application.		$25K.	renewed.
U13: Cooperative Conference Grant	This granting program provides support for scientific meetings, conferences, and workshops that are relevant the scientific mission of the NINDS. The U13 requires close collaboration with and input from NINDS Program staff in the conceptualization and administration of the program, e.g., agenda, speakers, and post-meeting publications.	May request partial salary for PI and other staff.	No limit, but generally less than $100K.	Up to 5 years, but generally 1 year. May be renewed.

Small Business Grants:

Mechanism – Program	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
R41: Small Business Technology Transfer (STTR), Phase I	To support cooperative R&D projects between small business concerns and research institutions, limited in time and amount, to establish the technical merit and feasibility of ideas that have potential for commercialization. Awards are made to small business concerns only.	Prorated based on PI % effort.	Up to $100K for phase I.	1 year, followed by STTR phase II.
R42: Small Business Technology Transfer (STTR), Phase II	To support in-depth development of cooperative R&D projects between small business concerns and research institutions, limited in time and amount, whose feasibility has been established in Phase I and that have potential for commercialization. Awards are made to small business concerns only.	Prorated based on PI % effort.	Up to $750K.	2 years.
R43: Small Business Innovative Research (SBIR), Phase I	To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas that may ultimately lead to a commercial product(s) or service(s).	Prorated based on PI % effort.	Up to $100K for phase I.	6 months, followed by SBIR phase II.
R44: Small Business Innovative Research (SBIR), Phase II	To support in-depth development of R&D ideas whose feasibility has been established in Phase I and which are likely to result in commercial products or services. SBIR Phase II are considered Fast-Track and do not require National Council Review.	Prorated based on PI % effort.	Up to $750K.	2 years.
U44: Cooperative Small Business Awards in Translational Research	This Cooperative Agreement aims to provide support for Phase II, and Fast-Track projects that directly address identification and pre-clinical testing of new therapeutics. Cooperative agreements include substantial involvement of NINDS staff.	Prorated based on PI % effort.	Up to $300K for Ph I of Fast-Track Up to $750K Up to $1M if include IND or IDE filing	Up to 2 years for Ph I of Fast-Track Up to 3 years

Institutional NRSA Training Grants:

Mechanism – Program ↓	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
T32: Institutional Training Awards	This training grant supports advanced (dissertation stage) predoctoral Ph.D. and M.D. students, postdoctoral fellows, or a mix of both. All applications to this program must have a central focus or theme. Funds should be used to support novel and/or expanded training opportunities.	Predocs: $22,476 per year. Postdocs: $42,000-$55,272 per year.	Predocs: $4,200 per year. Postdocs: $7,850 per year.	5-year award. Renewable.
T32: Jointly Sponsored Predoctoral Training in	This training grant is jointly sponsored by NINDS and 9 other NIH Institutes. It provides broad training in the Neurosciences focused on the early years of	Predocs: $22,476 per year.	Predocs: $4,200 per year.	5-year award. Renewable.

Neuroscience	training before full-time thesis research is started and allows institutions to consolidate their predoctoral training.			

Individual NRSA Fellowships:

Mechanism – Program ↓	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
F30: Individual Predoctoral Fellowships for Students in MD/PhD Programs	The Kirschstein-NRSA F30 award supports research and clinical training that leads to the MD/PhD degree or another dual-doctoral degree. Because the F30 program is intended to support individuals in an integrated, dual-degree program during both their graduate research training and clinical training, the F30 cannot be used to support only the clinical training years. Eligible applicants must be within the first 48 months of their dual-degree program at the time of application, and will not be supported after year 8 of dual-degree training.	$22,476 per year.	Up to $4,200 per year.	Up to 6 years. Non-renewable.
F31: Individual Predoctoral Fellowships for Students in MD/PhD Programs	This fellowship is designed to support up to 5 years of predoctoral research training for students in combined MD/PhD programs. This mechanism does not support medical school education. Individuals must be enrolled in an M.D. program at an accredited medical school, accepted in a related scientific Ph.D. program, and supervised by a mentor in that scientific discipline at the time of submission. Applicants must have a minimum of 1 year of dissertation research remaining at the time an award is made. The final receipt date for new applications was April 8, 2014. Resubmissions will be accepted through the December 8, 2014 receipt date after which this mechanism will be discontinued.	$22,476 per year.	Up to $4,200 per year.	Up to 5 years. Non-renewable.
F31: Individual Predoctoral Fellowships	This program is an individual NRSA for doctoral candidates that have successfully completed their comprehensive examinations and will be performing dissertation research and training. The NINDS will provide up to 3 years of support for candidates within their first 6 years of graduate school.	$22,476 per year.	Up to $4,200 per year.	Up to 3 years. Non-renewable.
F31: Predoctoral Fellowships to Promote Diversity	NINDS will provide up to 5 years of support for research training leading to the Ph.D. or equivalent research degree; the combined M.D./Ph.D. degree; or other combined professional doctorate/research Ph.D. degrees in the biomedical or behavioral sciences. These fellowships (F31) are for well-qualified students from diversity groups found to be underrepresented in the biomedical and behavioral sciences in the United States (as defined in the program announcement). The overall goal of this program is to increase the number of scientists from diverse population groups who are prepared to pursue careers in biomedical, behavioral, social, clinical, or health services research.	$22,476 per year.	Up to $4,200 per year.	Up to 5 years. Non-renewable.
F32: Individual Postdoctoral Fellowships	This individual NRSA targets individuals seeking postdoctoral research training in the basic and clinical neurological sciences.	$42,000-$55,272 per year.	Up to $7,850 per year.	Up to 3 years. Non-renewable.
F05: International Neuroscience Fellowship Program	This program provides a unique opportunity to qualified foreign neuroscientists, at the junior or mid-career level, to receive up to three years of research training in the United States (U.S.). Eligible individual applicants include non-immigrant foreign scientists with a doctoral degree (or its equivalent) and a sponsor in the U.S. who is affiliated with an eligible U.S. organization. This individual must also have an endorsement from their home institution, and an appointment in an institution in their home country upon completion of the fellowship. The	$42,000-$55,272 per year.	Up to $7,850 per year.	Up to 3 years. Non-renewable.

	proposed research training must be within the scope of biomedical, behavioral, or clinical research as it relates to neuroscience, and should enhance the trainee's knowledge and skills to conduct independent research in his or her home country.			
F33: Individual Senior Fellowships	This senior NRSA fellowship is for individuals beyond the new-investigator stage who wish to: 1) make major changes in their research direction; 2) broaden their scientific background; or 3) acquire new research skills.	Commensurate with base salary that would be paid by the institution with which the awardee is permanently affiliated.	Up to $7,850 per year.	Up to 3 years. Non-renewable.

Career Development Awards:

Mechanism – Program ↓	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
K01: NINDS Faculty Development Award to Promote Diversity in Neuroscience Research	The NINDS Faculty Development Award to Promote Diversity in Neuroscience Research (K01) provides junior faculty support and protected time (up to three years) for an intensive, supervised career development experience in neuroscience research. The goal of the NINDS K01 is to diversify the pool of independent neuroscience research investigators and to enhance the probability of success in obtaining independent NIH or other independent research support. Mentoring is expected to be appropriate for this stage of career and should focus on enhancing tenure track (or equivalent) activities or metrics (i.e., helping the junior faculty member to navigate institutional expectations, scientific networks, and practices that are relevant to productivity and advancement at the institution). Individuals from backgrounds underrepresented in biomedical research are eligible for support under this award if they have doctoral research degrees (Ph.D. or equivalent) and are in the first 3 years of a faculty position at the time of award.	Up to $85,000 per year.	Research and career development costs up to $100,000 per year.	Up to 3 years. Not renewable.
K02: Independent Scientist Award	This program provides a period of intensive research focus for newly independent clinical-scientists. The award provides salary and research costs for the first three years, and continued salary support for years four and five, contingent on successful competition for an R01 or equivalent award. In contrast to requirements of other institutes, applicants are not eligible for this award if they have a major, independent, peer-reviewed research grant (R01, subproject on a P01, or equivalent) prior to receiving the K02 award. Awardees are encouraged to apply for R01 support at any time after they've received the K02 award.	Years 1-3: Up to $105,000 per year. Years 4-5: Up to 80% of institutional base	Years 1-3: Up to $50,000 per year. Years 4-5: N/A	Up to 5 years. (Years 4/5 require R01). Not renewable.

K08: Mentored Clinical Scientist Research Career Development Award	This award provides "protected time" for clinically trained persons to participate in an intensive, supervised training program in biomedical research. Candidates must apply within 3 years of completing clinical training.	Up to $95,000 per year.	Up to $50,000 per year.	3-5 years. Not renewable.
K12: Neurological Sciences Academic Development Award (NSADA)	Institutional award to train pediatric neurologists for careers in research. Newly trained pediatric neurologists are selected and appointed to this program by the sponsoring institution. It is expected that individuals appointed to the NSADA program will subsequently apply for their own Mentored Clinical Scientist Development Award (K08), the Mentored Patient-Oriented Career Development Award (K23), an NINDS Research Scientist Development Award (K02) or an R01, to continue their research training.	Up to $85,000 per year.	Up to $30,000 per year.	Up to 5 years. May be renewed.
K23: Mentored Patient-Oriented Research Career Development Award	Supports the career development of clinically trained investigators with an M.D. or equivalent degree who have made a commitment to patient-oriented research. For the purposes of this award, patient-oriented research is defined as research conducted with human subjects (or on material of human origin such as tissues, specimens, and cognitive phenomena) for which an investigator directly interacts with human subjects. This area of research includes: 1) mechanisms of human disease; 2) therapeutic interventions; 3) clinical trials; and 4) the development of new technologies.	Up to $95,000 per year.	Up to $50,000 per year.	3-5 years research. Not renewable.
K24: Midcareer Patient-Oriented Research Career Development Award	Supports clinicians (M.D. degree or equivalent) devoted to patient-oriented research and to mentoring of beginning clinical investigators in this area of research. Candidates must have independent research support at the time of application and maintain independent research support for the duration of the career award. NINDS has detailed programmatic priorities with regard to the mentoring component of the K24 award. Potential applicants are urged to contact the NINDS Director of Training and Career Development **before** preparing an application.	Salary of 25 to 50% full-time professional effort consistent with the established salary structure at the institution	Up to $50,000 per year for mentoring activities.	Up to 5 years. May be renewed.

K22: NINDS Advanced Postdoctoral Career Transition Award to Promote Diversity in Neuroscience Research	The NINDS Advanced Postdoctoral Career Transition Award to Promote Diversity (K22) is designed to increase the number of highly trained early career investigators from diverse backgrounds underrepresented in neuroscience research. This opportunity provides individuals from diverse backgrounds underrepresented in neuroscience with the resources and tools that will help facilitate a transition to a stable and productive independent research position. Individuals are eligible for support under this award if they have doctoral research degrees (Ph.D., Ph.D./M.D. or equivalent) and between 2 and 5 years of postdoctoral research experience at the time of application. This award is divided up into two phases: an advanced postdoctoral training period (Phase I) and a subsequent independent position (Phase II). Transition from Phase I to II is contingent on the awardee securing an independent faculty position by the completion of Phase I.	Phase I: Follows NRSA salary guidelines based on years of experience Phase II: Up to $85,000 per year	Phase I: research and career development costs up to $25,000 per year Phase II: research and career development costs up to $100,000 per year	Phase I: 2-3 years. Phase II: up to 3 years. Total duration of Phase I and II may not exceed 5 years. Not renewable.
K99/R00: Pathway to Independence Award	The intent of this program is to increase and maintain a strong cohort of new NIH-supported independent investigators. Investigators complete supervised research and publish findings during the mentored phase. Transition to the independent phase is contingent on the awardee securing an independent research position prior to completion of the mentored phase. Award recipients will be expected to obtain R01 support from the NIH during the independent phase of the award.	Up to $50,000 per year. (Intramural candidates will be supported by DIR funds)	Up to $20,000 per year. (Intramural candidates will be supported by DIR funds)	Up to 2 years for the mentored phase, up to 3 years for independent phase. Not renewable.

Training for Diverse Populations:

Mechanism – Program ↓	Program Synopsis	Salary/ Stipend	Budget Info.	Duration/ Renewal
NINDS Research Supplements to Promote Diversity in Health-Related Research	Supplemental funds to active NINDS research grants are available from the NINDS for supporting individuals a) from underrepresented ethnic or racial groups, b) from disadvantaged backgrounds, or c) with disabilities. This program is part of an NIH initiative to increase diversity in the biomedical research workforce. Institutions are encouraged to identify candidates who will increase diversity on a national or institutional basis. This program targets six educational groups: High School Students, Undergraduate Students, Post-Baccalaureate and Post-Master's Degree Students, Graduate Students, Postdoctoral Candidates, and Faculty Members. In all cases, the proposed research experience must be an integral part of the approved, ongoing research of the parent grant and it must have the potential to contribute significantly to the research career development of the candidate. In addition to an outlined training plan for the candidate, the principal investigator must demonstrate that they are willing to provide appropriate mentorship. These programs have been designed to attract individuals from underrepresented groups into research careers and are not intended to provide an alternative or additional means of supporting individuals who already receive support from an NIH research grant, an NIH National Research Service Award (NRSA), or any	Salary for the different educational groups should be consistent with the institutional salary policies.	Varies depending on the career level of the candidate. Information can be found on FOA Section 111.3.	Minimum of 2 years/not renewable

	other DHHS funding mechanism. Applications may be submitted at any time by investigators holding NINDS grants (see program announcement for eligible grant mechanisms). Though supplements are received on a rolling basis NINDS implemented three review cycles per fiscal year for funding decisions (see NOT-NS-08-004).			
Research Supplements to Promote Re-Entry into Biomedical and Behavioral Research Careers	The Office of Research on Women's Health (ORWH), participating Institutes and Centers (ICs) of the National Institutes of Health (NIH), and the Office of Dietary Supplements (ODS) announce a continuing program for administrative supplements to research grants to support individuals with high potential to re-enter an active research career after a qualifying interruption for family or other responsibilities. The purpose of these supplements is to encourage such individuals to re-enter research careers within the missions of all the program areas of NIH. This program will provide administrative supplements to existing NIH research grants for the purpose of supporting full-time or part-time research by these individuals in a program geared to bring their existing research skills and knowledge up to date. Though supplements are received on a rolling basis NINDS implemented three review cycles per fiscal year for funding decisions. (see NOT-NS-08-004).	Must be in accordance with the salary structure of the grantee institution	Up to $10,000	1-3 years/not renewable.
F31: Predoctoral Fellowships to Promote Diversity	See Individual NRSA Fellowships for more information.			
K01: NINDS Faculty Development Award to Promote Diversity in Neuroscience Research	See Career Development Awards for more information.			
K22: NINDS Advanced Postdoctoral Career Transition Award to Promote Diversity in Neuroscience Research	See Career Development Awards for more information.			

Writing a Grant Application: An Informal Guide

1. Essentials

a. Significance
b. Sound, clear hypotheses
c. Productivity and demonstration of feasibility -- high quality results and figures
d. Logical development of experimental design – experiments address stated hypotheses
e. Can you do everything you propose to do in the time requested -- “Overly Ambitious” is one of the most common criticisms of young investigators.
f. Plan ahead and don't rush -- give yourself at least 2-3 months to prepare the grant application.
g. Arrange with colleagues or mentors to review a first draft of your specific aims early (6 weeks or so). You want the harshest critiques before you submit.

2. Specific aims

a. Do the aims address interesting and significant issues?
b. Are they hypothesis-based?
c. Are they "win-win" – i.e., will an outcome consistent with the null hypothesis still be a contribution to the field?

3. Preliminary results

a. Preliminary results should support feasibility of study and hypotheses.
b. Make sure that the major methods to be used in the proposed work are reflected by preliminary results. If you do not have expertise or preliminary results with a technique, make sure you list a solid, experienced consultant or collaborator and include a letter agreeing to the collaboration, and a specific statement about what the collaborator will contribute.
c. Put time and effort into preparing meticulous figures, graphs, or tables; this is your chance to demonstrate rigor and organization that will increase the reviewer's confidence that you can carry out the project. This cannot be overemphasized: a high quality application reflects high quality work (and vice-versa).

4. Experimental design

a. This is one of the most common places where the text is insufficient. This is not just a place to tediously list group sizes, detailed methods, etc. This is the place to demonstrate your ability to think knowledgeably and logically.
b. Develop your aims; of all the sections this may well be the part of the grant application upon which you spend the most time.
c. What happens if your first specific aim doesn’t work out as you have predicted? Will aims 2, 3 and 4 then be rendered useless? Where do you go if the first step fails? Have multiple working hypotheses.

d. One method that often works is to divide this section into subheadings after *each* specific aim is restated, as follows:
   Specific Aim #
   i. ***Rationale*:** How does this design relate to your hypotheses? What is your reasoning (in detail)?
   ii. ***Methods*:** List general approaches first, explaining why the methods you propose are the best available for your questions. (*caveat*: if you realize that you do not have the best, most direct methods for your questions, you need to rethink your aims or incorporate collaborators or new preliminary data showing feasibility with the necessary techniques.) **Don't forget to address statistical analysis.
   iii. ***Anticipated results*:** You need to devote a great deal of thought, and text, to potential outcomes and their likelihood of realization. Explain how you will interpret the different outcome scenarios and how these results relate back to your hypotheses. This is an opportunity to demonstrate creativity and enthusiasm for the data to be obtained, and show that you have considered the interpretation of alternative outcomes.
   iv. ***Problems and pitfalls:*** Be honest with yourself. If this section feels horribly uncomfortable, it is because you are probably trying an experiment that is not feasible. All experiments have pitfalls, but you should be able to recover from them in a satisfactory way. Explain the pitfalls, and how alternate approaches will be used to overcome them if they occur. Do not think that avoiding mentioning a pitfall is a good strategy - it usually doesn't work. The reviewer will very likely notice the pitfall and believe that you are not aware of it, decreasing confidence in your ability to conduct the study.

5. Timetable

This is a worthwhile exercise, but does not need to take up an inordinate amount of space. The idea is to take a serious look at the amount of work you've proposed and demonstrate to reviewers that this amount is appropriate.

6. Responsible Conduct of Research (RCR)

In order to receive an award, applicants must comply with the NIH RCR policy. Pay close attention to the instructions listed in the notice (NOT-OD-10-019: http://grants.nih.gov/grants/guide/notice-files/not-od-10-019.html).

7. Contact an NIH Program Director

Not all institutes support all grant mechanisms. Moreover, institutes use grant mechanisms differently. Be sure that an institute will support your research/training with the mechanism you are applying to. Institute websites and web links in program announcements describe institute interests. You should also contact an institute program director if you plan to apply for a training award other than an F32 (which all institutes support).

Common Mistakes in NIH Grant Applications

The five review criteria for most NIH grant applications are Significance, Approach, Innovation (not necessary, but the results should have compelling significance), Investigator and Environment:

Problems with Significance:

Not significant, exciting, or new research
Lack of compelling rationale
Incremental and low impact research

Problems with Approach:

Too ambitious, too much work proposed
Unfocused aims, unclear goals
Limited aims and uncertain future directions

Problems with Experimental Design:

Inappropriate level of experimental detail
Feasibility of each aim not shown
Little or no expertise with approach
Lack of appropriate controls
Not directly testing hypothesis
Correlative or descriptive data
Experiments not directed towards mechanisms
No discussion of alternative models or hypotheses
No discussion of potential pitfalls
No discussion of interpretation of data
Inadequate description of statistical approach/analyses

Problems with Investigator:

No demonstration of expertise or publications in approaches
Low productivity, few recent papers
No collaborators recruited or no letters from collaborators
Lack of funding

Problems with Environment:

Inadequate institutional support

NIH Websites

THE FUNDING COMPONENTS OF NIH

The NIH Homepage:
http://www.nih.gov

Homepages of the NIH Institutes, Centers & Offices:
http://www.nih.gov/icd/

THE NIH GUIDE FOR GRANTS AND CONTRACTS:

Program Announcements (PAs) and
Request for Applications (RFAs):
http://www.nih.gov/grants/guide/index.html

Institutes, Centers, & Offices at the NIH
http://www.nih.gov/icd/

NIH Grants Policy Statement
http://grants.nih.gov/grants/policy/nihgps/

THE APPLICATION PROCESS

NCI's Quick Guide to the Preparation of
NIH Grant Applications:
http://deainfo.nci.nih.gov/extra/extdocs/gntapp.pdf

Application Receipt, Referral and Review,
Center for Scientific Review:
http://www.nih.gov/grants/funding/submissionschedule.htm
and
http://www.csr.nih.gov/

NIH Grant Application Instructions, Guidelines and Forms:
http://www.nih.gov/grants/forms.htm

NIH Modular Grant Information, Q&A,
Sample Budget and Biosketch:
http://www.nih.gov/grants/funding/modular/modular.htm

NIAID "*How To*" website for developing a grant application:
http://funding.niaid.nih.gov/researchfunding/grant/pages/aag.aspx

THE REVIEW PROCESS

The Five Review Criteria for Most NIH applications:
http://grants.nih.gov/grants/guide/notice-files/NOT-OD-09-025.html

Descriptions of Initial Review Groups at the
Center for Scientific Review:
http://www.csr.nih.gov/review/irgdesc.htm

NIH Center for Scientific Review Study Section Rosters:
http://www.csr.nih.gov/committees/rosterindex.asp

DATA ON ACTIVE GRANTS

Research Portfolio Online Reporting Tool (RePORT) of NIH awarded grants
http://projectreporter.nih.gov/reporter.cfm

NIH eRA commons:
https://commons.era.nih.gov/commons/

THE SPECIAL PROGRAMS AT NIH

The K Awards:
http://www.nih.gov/training/careerdevelopmentawards.htm

Application Guidelines for the K Awards:
http://grants.nih.gov/grants/funding/424/index.htm

Ruth L. Kirschstein National Research Service Awards
Institutional Research Training Grants
Individual Fellowships
http://grants.nih.gov/training/nrsa.htm

R03/Small Grant Program
http://www.nih.gov/grants/funding/r03.htm

AREA or R15 for Non-Research-Intensive
Colleges and Universities:
http://www.nih.gov/grants/funding/area.htm

SBIR/STTR Homepage:
http://www.nih.gov/grants/funding/sbir.htm

Where to find Help

NINDS Office of Training, Career Development and Workforce Diversity

The NINDS supports training opportunities in basic, clinical and translational research. Career development programs (K awards) are designed primarily to support clinician-scientists doing either basic or clinical research, but are also used for other specialized purposes. Fellowships (F awards) are available for predoctoral and postdoctoral scientists, as well as for established investigators who wish to change career direction or gain new skills for their research. The NINDS Training website (http://www.ninds.nih.gov/funding/areas/training_and_career_development/index.htm) provides the following types of information:

- Grant mechanisms and other funding opportunities
- Policy updates affecting training and career development programs
- Application information and forms
- Program Contacts
- Grant-writing tips
- Events of Interest

How can I find out about grant opportunities at the NIH?

There are a variety of ways to find out about current funding opportunities offered by the NIH.
If you know the Institute to target with your application, you can visit their website directly to find funding opportunities. A list of the NIH Institutes and their respective websites can be found here:
http://www.nih.gov/icd/

If you would like to search for a specific NIH funding opportunity or review new NIH program announcements, you can query the NIH Guide for Grants and Contracts:
http://grants.nih.gov/grants/guide/index.html

For all federal funding opportunities, you can query Grants.gov:
www.Grants.gov

The Career Award Wizard is designed to help applicants determine what Career (K) Award programs they may be eligible for based on their level and type of training:
http://grants1.nih.gov/training/careerdevelopmentawards.htm

New Table of Page Limits For all NIH funding opportunities:
http://grants.nih.gov/grants/forms_page_limits.htm

The F Kiosk is designed to help applicants discern which fellowship programs are appropriate for their career stage: **http://grants1.nih.gov/training/F_files_nrsa.htm**

The NIH New Investigator Resource Page provides timely updates regarding grant opportunities for new investigators:
http://grants1.nih.gov/grants/new_investigators/index.htm

Funding opportunities through the NIH Roadmap for Medical Research and the NIH Blueprint for Neuroscience Research are posted on their respective websites:

- NIH Roadmap: http://nihroadmap.nih.gov/
- NIH Blueprint: http://neuroscienceblueprint.nih.gov/

Loan repayment programs are available for some candidates.

- NIH Loan Repayment Program:

http://www.lrp.nih.gov

- NINDS Loan Repayment Program: **http://www.ninds.nih.gov/funding/areas/training_and_career_development/NINDS_Loan_Repayment_Guidelines.htm**

How can I find out about training opportunities at the NIH?

There are opportunities for students, postdocs, clinicians, and other investigators to come to the NIH for a research training experience.

- For opportunities across the NIH: http://www.training.nih.gov/
- For opportunities at NINDS: http://intra.ninds.nih.gov/training.asp

What must I know before I apply?

After identifying grant opportunities that suit your research interests and career stage, familiarize yourself with appropriate forms and deadlines. You may also want to contact program staff to ensure that the proposed research is in line with the mission of the Institute(s) targeted by your application.

NIH Forms and Applications
http://grants.nih.gov/grants/forms.htm

Grant Submission Deadlines and Review Timelines
http://grants.nih.gov/grants/funding/submissionschedule.htm

Electronic Submission of Applications General Information:
http://era.nih.gov/ElectronicReceipt/index.htm

Timeline for Required use of Electronic Submission:
http://era.nih.gov/ElectronicReceipt/files/Electronic_receipt_timeline_Ext.pdf

To apply for a grant, your organization must be registered with Grants.gov:
www.grants.gov

The NIH eRA Commons allows applicants to track the status of their application and monitor their award. Registration is required:
https://commons.era.nih.gov/commons/

Where can I find grant-writing tips?

Several Institutes have developed materials to guide new investigators through process of grant-writing. A few of these resources are listed below with a reference to the

authoring Institute.

Grants Tutorials (NIAID)
http://funding.niaid.nih.gov/researchfunding/grant/pages/aag.aspx

Tips for new NIH Grant Applicants (NIGMS)
http://www.nigms.nih.gov/Research/Application/Tips.htm

Common Mistakes in NIH Applications (NINDS)
http://www.ninds.nih.gov/funding/grantwriting_mistakes.htm

Grant Writing: A 12-Step Program (NIMH)
http://www.ninds.nih.gov/funding/NLD_SfN_Oct_2005.pdf
A Short Guide to the Preparation of an NIH R01 Grant Applications (NCI)
http://deainfo.nci.nih.gov/extra/extdocs/gntapp.pdf

Understanding Peer Review

Several online resources are available to demystify the review process.

The Peer Review Process
http://cms.csr.nih.gov/AboutCSR/OverviewofPeerReviewProcess.htm

Video on Peer Review at NIH
http://cms.csr.nih.gov/ResourcesforApplicants/InsidetheNIHGrantReviewProcessVideo.htm

Review Group Descriptions
http://cms.csr.nih.gov/PeerReviewMeetings/CSRIRGDescription/

Study Section Rosters
http://www.csr.nih.gov/Committees/rosterindex.asp

Contacts:

Be sure to review the contact list associated with the funding opportunity announcement through which you are applying.

Institute-specific requirements and contacts for parent Career Award Programs

K01: **http://grants.nih.gov/grants/guide/contacts/parent_K01.html**

K08: **http://grants.nih.gov/grants/guide/contacts/parent_K08.html**

K23: **http://grants.nih.gov/grants/guide/contacts/parent_K23.html**

K25: **http://grants.nih.gov/grants/guide/contacts/parent_K25.html**

K99/R00: **http://grants.nih.gov/grants/guide/contacts/parent_K99_R00.html**

K02: **http://grants.nih.gov/grants/guide/contacts/parent_K02.html**

K24: **http://grants.nih.gov/grants/guide/contacts/parent_K24.html**

In addition, each Institute has appointed contact persons for Extramural (E) and Intramural (I) Training Programs: **http://grants.nih.gov/training/tac_training_contacts.doc**

Other useful websites:

NIH OER Human Subjects Website
http://grants1.nih.gov/grants/policy/hs/index.htm

NIH OER Office of Laboratory Animal Welfare Website
http://grants2.nih.gov/grants/olaw/olaw.htm

NIH Office of Research Integrity Website
http://ori.dhhs.gov/

Howard Hughes Medical Institute (HHMI) Materials for Successful Laboratory Management
http://www.hhmi.org/resources/labmanagement/resources.html

System Map

metro

MetroOpensDoors.com
Customer Information Service: 202/637-6000
TTY Phone: 202/638-3780

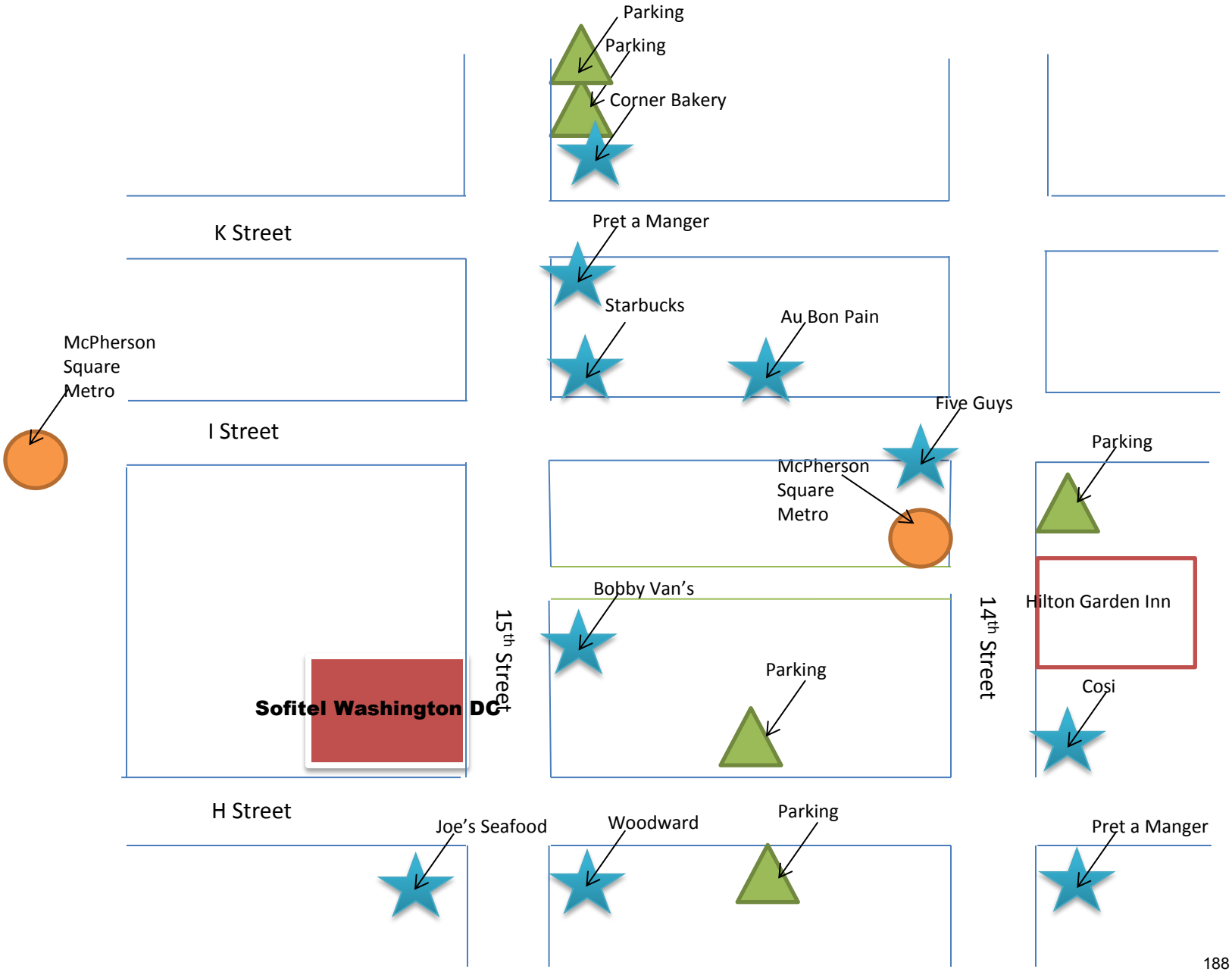
Legend

- Red Line • Glenmont to Shady Grove
- Orange Line • New Carrollton to Vienna/Fairfax-GMU
- Blue Line • Franconia-Springfield to Largo Town Center
- Green Line • Branch Avenue to Greenbelt
- Yellow Line • Huntington to Fort Totten

Station in Service
Commuter Rail (Virginia Railway Express, MARC)
Bus to Airport
Transfer Station
Parking

REV 10/27/08

No Smoking
No Eating or Drinking
No Animals (except service animals)
No Audio (without earphones)
No Litter or Spitting
No Dangerous or Flammable Items


Parking
Parking
Corner Bakery
K Street
Pret a Manger
Starbucks
Au Bon Pain
McPherson
Square
Metro
I Street
Five Guys
Parking
McPherson
Square
Metro
Bobby Van's
15th Street
14th Street
Hilton Garden Inn
Parking
Cosi
Sofitel Washington DC
H Street
Joe's Seafood
Woodward
Parking
Pret a Manger

SOFITEL
ACCOR HOTELS & RESORTS

NEARBY RESTAURANTS

Café 15
French
806 15th St., NW
730-8800

DC Coast
Seafood
1401 K St, NW
216-5988

Equinox
American
818 Connecticut Ave., NW
331-8118

Le Bar
American
806 15th St., NW
730-8800

Lima*
Latin
1401 K St., NW
789-2800

Bombay Club
Indian
815 Connecticut Ave, NW
659-3727

Bobby Van's
Steakhouse
809 15th St., NW
589-0060

Ceiba*
Latin
701 14th St., NW
393-3983

Olives*
Mediterranean
1600 K St., NW
452-1866

Old Ebbitt Grill
American
675 15th St., NW
347-4801

McCormick & Schmick's
Seafood
1652 K St., NW
861-2233

Café Asia
Pan-Asian
1720 I St., NW
659-2696

Georgia Brown's
Southern
950 15th St., NW
393-4499

Butterfield 9
New American
600 14th Street, NW
289-8810

BLT Steak*
Steakhouse
1625 I St., NW
689-8999

Gerard's Place*
French
915 15th St., NW
737-4445

Il Mulino*
Italian
1110 Vermont Ave., NW
293-1001

Occidental
American
1475 Pennsylvania Ave., NW
783-1475

Tuscana West*
Italian
1350 I St., NW
289-7300

Kaz Sushi Bistro*
Japanese
1915 I St., NW
530-5500

Willard Room
American/French
1401 Pennsylvania Ave., NW
637-7440

Café Mozart
German/Austrian
1331 H St., NW
347-5732

Oval Room*
American
800 Connecticut Ave., NW
463-8700

Café du Parc
French
1401 Pennsylvania Ave., NW
942-7000

Please contact the Concierge for reservations
**indicates restaurant is closed Sunday*

Concierge phone (202) 730-8430
Concierge fax (202) 730-8510

Association of University Professors of Neurology
CCRC EXPENSE REIMBURSEMENT FORM

Your Name:

Your Address:

Meeting Attended: CCRC Symposium

Location: Sofitel Lafayette Square 806 15th Street NW Washington, DC 20005

Dates: Friday, June 24 – Saturday, June 25, 2016

OUT OF POCKET EXPENSES REIMBURSABLE BY AUPN. PLEASE EXPLAIN ANY UNUSUAL EXPENSE ITEMS.

INCLUDE SCANNED COPIES OF RECEIPTS

DATES	6/23	6/24	6/25	6/26	6/27	TOTAL
Lodging						
Meals						
Tips						
Air Transportation						
Ground Transportation						
Other (explain below)						
Subtotal						
Less Personal (indicate on receipts)						
Less Advances						
TOTAL EXPENSES						

Additional Explanation:

_____

_____

Entertainment

_____

_____

_____ _____

Traveler Signature Date Approval Signature Date

Return with Receipts to neuro@aupn.org

Accounting Use Only
Acct#
Amount

Contact Information

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