The AMBI is an interdisciplinary group, embedded into the Center on Aging, seeking innovative ways to diagnose, prevent, and delay natural or disease-related cognitive, functional, and mental decline with aging.
Aging Mind and Brain Initiative (AMBI)

MISSION

The Aging Mind and Brain Initiative continues to seek innovative and interdisciplinary methods for the diagnosis and prevention of the disorders of aging that incur cognitive or functional decline.

VISION

Campus-wide integration of world-class brain research programs that are charged with tackling the diseases of aging in partnership with the expertise of newly hired faculty.

A “connectome,” or map of neural pathways and wires, of a human brain (Human Connectome Project)  
http://www.humanconnectomeproject.org/gallery/
AGING INTO THE FUTURE

Young Children and Older People as a Percentage of Global Population: 1950 to 2050

Global trends of young children (under 5 years) and seniors (65 and over) suggest a continued decline in children and a dramatic surge in seniors, in particular of the oldest old of 80 years or more that are more likely to have chronic conditions that disproportionately consume public resources. Source: An Aging World: 2015

Americans Aged 100 and Older

Oldest old will increase 16 times, leading unfortunately to increased morbidity while prolonging life. Aging Mind and Brain Initiative (AMBI)
Executive Summary

FACULTY

The recent WHO report supported by the US Census Bureau succinctly summarizes the demographic insights: “Aging is reshaping our world” (‘An Aging World’ 2016). The projected tripling of people over the age of 65 and the 16-fold increase of people over the age of 100 by 2050 will increase the pressure on our social and health care systems. To develop countermeasures at all NIH fundable levels (bench, beside, outreach), the AMBI forged an exemplary team of interactive investigators across the following areas: Long-term care, family and social welfare policy (Kanika Arora PhD, CPH), Social factors in aging and health (Ashida, CPH), Mobile and e-Health systems (Chipara, CLAS), Neuroimaging processing and MR imaging (Jacob, COE), Regulation and structure of myelin in neurodegeneration (Kamholz, CCOM), Dementia in long-term care (Liu, CON), Cognitive symptoms of Parkinson’s disease (Narayanan, CCOM), Understanding cognitive artifacts in aging (Pennathur, COE), Neuronal control of cellular stress responses (Prahlad, CLAS), Neural mechanisms underlying monitoring and adaption of behavior and cognition (Wessel, CLAS), Communication in elderly caregiving (Williams, CON), and Neuroscience of aging (Voss, CLAS).

NEW FACULTY 2015-16

Searches for two new faculty in CLAS Biology and CCOM Neurology have identified potential candidates but will likely be completed in 2016-17. AMBI/CoA was restructured to reflect the loss of Susan Schultz.

SPONSORED FUNDING

In FY16, our 12 AMBI Faculty have successfully been awarded 17 funded grants as PIs or Multi-PIs for a total of $1,723,283 from NIH, NSF, DOD, IDHS, Ellison Medical Foundation, Vaccinex, American Cancer Society, Merck Sharp & Dohme Co., and internal funding for a grand total of $18 million since AMBI’s inception (2011). Despite this success they continue to apply for support, with an additional 28 grants pending for a total of $14,909,123. Three groups have formed on specific topics: The dementia care group is preparing for a grant opportunity in 2016, the frailty assessment group is designing EPIC driven data collections for a U19 application in 2017, and the Htt group is generating preliminary data for proof-of-principle of a novel approach to counteract protein accumulation with a submission targeted for 2017. Director Susan Schultz was PI on a grant funded by Health Research & Services Administration and Co-Investigator or the Clinical and Translational Science Award grant with combined total funding of $4,375,456.

THE FUTURE

Our goal is for AMBI to continue to gain recognition as a comprehensive center that is truly translational to the community through the integration of the AMBI with geriatric education (GWEP, HRSA), clinical care (Frailty, Htt) and outreach (dementia care). We have successfully assembled the chapters for a comprehensive text: The Wiley Handbook on the Aging Mind and Brain (eds: Rizzo, Anderson, Fritzsch) will be submitted to the publisher in 2016-17. AMBI members were integral for winning the HRSA “Geriatric Workforce Enhancement Program” grant and contributed to the geriatric “special population” section of the CCOM CTSA grant. AMBI faculty are integrated into a workforce of three main areas each targeted with grant applications scheduled for 2016/17 to expand in all areas outlined by the NIH strategic plan (bench, bedside and outreach).
Highlights of the most recent US Census report possibly include:

- America’s 65-and-over population is projected to nearly double over the next three decades, from 48 million to 88 million by 2050.
- By 2050, global life expectancy at birth is projected to increase by almost eight years, climbing from 68.6 years in 2015 to 76.2 years in 2050.
- The global population of the “oldest old” — people aged 80 and older — is expected to more than triple between 2015 and 2050, growing from 126.5 million to 446.6 million. The oldest old population in some Asian and Latin American countries is predicted to quadruple by 2050.
- Among the older population worldwide, non-communicable diseases are the main health concern. In low-income countries, many in Africa, the older population faces a considerable burden from both non-communicable and communicable diseases.
- Risk factors — such as tobacco and alcohol use, insufficient consumption of vegetables and fruit, and low levels of physical activity — directly or indirectly contribute to the global burden of disease. Changes in risk factors have been observed, such as a decline in tobacco use in some high-income countries.

This is why our work is so vitally important

From 2025 to 2050, the older population (65+) is projected to almost double to 1.6 billion globally, whereas the total population will grow by just 34 percent over the same period.


Previous goals:
- The Wiley Handbook on the Aging Mind and Brain, All chapters are in, deadline for submission 9/2016.
- Applied for and received a HRSA “Geriatric Workforce Enhancement Program” grant (2015-2018)
- Contributed to the geriatric “special population” section of the CCOM/CTSA grant, awarded for 2015-2017.

Future goals (2016-17):
- Publish the Wiley Handbook on the Aging Mind and Brain, target 2017.
- Develop interactive grants targeted for NIA U19 mechanism on
  - Dementia
  - Frailty
  - Huntington’s

Long term goals:
- Become the central aging hub for the state of Iowa through interactions with other groups to coordinate state wide basic, translational and outreach programs.
2015-16 Leadership

Susan K. Schultz, MD, is leaving the University of Iowa at the end of April 2016, to accept a position of Professor in the Department of Psychiatry at the University of South Florida and the James Haley VA Tampa. Susan has been with the University of Iowa Department of Psychiatry for the last 26 years, completing her psychiatry residency, research fellowship and then going on to develop a research program studying brain imaging in clinical conditions such as Alzheimer’s disease. She has also developed a clinical trial program at Iowa, by teaming with the Alzheimer’s Disease Cooperative Study (now the Alzheimer’s Therapeutics Research Institute) that oversees a world-like network for growth in diagnostic PET imaging, experimental medication trials, biomarker and genetic analyses that will advance the field toward disease modifying treatments for dementia. Dr. Schultz has also advanced the field through editorial work with the American Journal of Psychiatry and the Diagnostic and Statistical Manual for Mental Disorders (the DSM-5). The Aging Mind and Brain Initiative and the Center on Aging will miss her expertise and we thank her for her many years of service!

Bernd Fritzsch, PhD, will assume Directorship of the Aging Mind & Brain Initiative.

In July 2015, Bernd Fritzsch, Co-director of the Aging Mind & Brain Initiative and incoming Director for 2016, was elected as a member of the German National Academy of Sciences, the Leopoldina, in recognition of his scientific achievements. He is also an Endowed Iowa Entrepreneurial Professor. His research areas include cell and developmental biology, evolution, genetics, and neurobiology of the aging ear.

Founded in 1652, the Leopoldina is the oldest continuously operating scientific academy. Membership is an honor given only to about 1500 scholars, and being elected is comparable to becoming a member of the US National Academy of Sciences.

2016-17 Leadership

Gerald Jogerst, MD, a geriatric Professor from the Department of Family Medicine and Director of their Geriatrics Fellowship Program (CCOM), will assume the co-Directorship of the Center on Aging.

Ryan Carnahan, PharmD, MS, BCPP, an Associate Professor in CPH, is involved in improving dementia care in nursing homes, will serve as co-Director of the education and outreach program.

Marianne Smith, PhD, RN, an Associate Professor in CoN, aims to improve lives of older adults with various health problems, will connect the AMBI/CoA to the HRSA/GWEP education program she directs.

Directors (2015-2016)

Susan K. Schultz, MD, Director
Bernd Fritzsch, PhD, Co-Director

AMBI Executive Committee

Gerald Jogerst, MD (CCOM)
John Kamholz, MD PhD (CCOM)
Jodie Plumert, PhD (CLAS)
Susan Schultz, MD (AMBI Exec)

AMBI Internal Advisory Committee

Keela Herr, PhD, RN, FAAN, AGSF
Robert Philibert, MD, PhD
Susan Schultz, MD
Robert Wallace, MD

AMBI External Advisory Committee

Brian Kennedy, PhD
President and CEO
Buck Institute for Research on Aging
John Renger, PhD
Executive Director, Neuroscience Discovery
Merck & Co., Inc.

Philip Pizzo, MD
Founding Director, The Stanford Distinguished Careers Institute
Former Dean, School of Medicine
David and Susan Heckerman
Professor of Pediatrics and Microbiology and Immunology
Aging Mind and Brain Initiative (AMBI)

In FY16, AMBI Faculty have 17 funded grants as Principal Investigator or Multi-PI for a total of $1.73 million from organizations such as National Institutes of Health, US Department of Defense, National Science Foundation, Vaccinex, Inc., Merck, Ellison Medical Foundation, subcontracts from other academic institutions, as well as internal funding initiatives.

There are an additional 28 grants pending for a total of $14.9 million.

Since FY11, the inception of the AMBI, our faculty and directors have a total of been awarded a total of $18 million, either in Principal Investigator, Multi-PI, or Co-Investigator roles.

All AMBI faculty have obtained independent funding of some type since their arrival at the University of Iowa.

Director Susan Schultz was PI on a grant funded by Health Research & Services Administration and Co-Investigator or the Clinical and Translational Science Award grant with combined total funding of $4,375,456.

### PUBLICATIONS BY AMBI FACULTY AND LEADERSHIP SINCE 2011

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<th>AMBI Faculty</th>
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<td>Kanika Arora</td>
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<td>Sato Ashida</td>
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<td>Octav Chipara</td>
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<td>Mathews Jacob</td>
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<td>Wen Liu</td>
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<td>Steven Anderson</td>
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<td>John Renger (Merck)</td>
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<td><strong>TOTAL</strong></td>
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### RESEARCH GRANT FUNDING

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- All AMBI faculty have obtained independent funding of some type since their arrival at the University of Iowa.
- Director Susan Schultz was PI on a grant funded by Health Research & Services Administration and Co-Investigator or the Clinical and Translational Science Award grant with combined total funding of $4,375,456.
FACULTY UPDATES

Kanika Arora, PhD, is an Assistant Professor in the Department of Health Management and Policy, College of Public Health, and joined the AMBI in August 2015. Dr. Arora’s research focuses on the impact of state and federal policies on caregiving behavior and health outcomes in older adults. She has served a key role with the Institute for Clinical and Translational Science (ICTS) with the Carver College of Medicine, serving on its Evaluation Core and as the representative to the “Lifespan Taskforce” that seeks to engage the special populations of children and the elderly in clinical translational research.

During the past year, Dr. Arora’s scholarly activities continue to be significant, including a recently accepted first-author paper titled “How does dementia onset in parents influence unmarried adult children’s wealth?” in Social Science and Medicine, as well as another paper submitted this year and three more in preparation. She has gained support from NIH funding due to her involvement with the University of Iowa Clinical and Translational Science Program (ICTS) and has diligently submitted for internal funding this past year as well with favorable results. She has been admirably growing her collaborative circle as she increases her engagement with the ICTS.

Dr. Arora taught a Spring 2016 course entitled Medicare and Medicaid Policy. She has one peer reviewed paper in press, as well as one book. She is the recipient of a 2016 AMBI Pilot Grant and has 20% FTE effort on the UI CTSA Award.

Sato Ashida, PhD, is an Assistant Professor in the Department of Community and Behavioral Health, College of Public Health. Dr. Ashida’s research program examines the roles of social networks and relationships in health and health-related behaviors. She also contributed to the Iowa Geriatric Education Center with a presentation in the Dementia Lecture Series on “Social Relationships, Family Communication, and Well-Being.”

Her publications have been substantive, with seven peer reviewed papers over the last year, with clear evidence of a cohesive focus to her work that is promising for success in future funding. She has three additional manuscripts under review and three more in preparation.

Her teaching activity is highly relevant to older adult outcomes, a core mission of AMBI, as she continues her courses in Health Promotion and Disease Prevention as well as Special Topics: Social Relationships, Health and Aging. She is supervising a number of research mentees as well and has served on three dissertation committees in the last year.

Dr. Ashida’s funding progress is excellent; she has been a co-investigator on five funded proposals over the last year and has recently completed her own Retirement Research Foundation study on disaster preparedness for older adults. She has also received funding from the Center on Aging/AMBI pilot initiative on “Evaluation of the Consolidation of Iowa’s Area Agency on Aging” with her AMBI colleague Kanika Arora. Finally, she has served a key role in the new HRSA funding for the Geriatric Workforce Enhancement Program (GWEP), on which she has taken the lead role in the “Family Involvement in Care” project.
Octav Chipara, PhD, is an Assistant Professor in Computer Science, College of Liberal Arts and Sciences. Dr. Chipara’s research focuses on the next generation of wireless sensor networks that is expected to have a profound societal impact: we will entrust sensor systems to monitor critical infrastructure, collect vital signs from ambulatory patients in hospitals, and disseminate medical and planning information during emergency responses.

Dr. Chipara had a very good year during which he published three conference papers and a research report. Most notable is that one of his conference papers was awarded a ‘Best Paper Award’. He is currently funded through three grants by the Department of Education/NIDRR, NSF and The Roy J. Carver Charitable Trust through 2019. Dr. Chipara participated in and gave talks at 4 meetings, one of which was an international meeting.

Mathews Jacob, PhD, was promoted to Associate Professor in the Department of Electrical and Computer Engineering, College of Engineering in 2015, and has been with the AMBI since 2011. His research interests include reconstruction of image data from magnetic resonance imaging systems, with special focus on dynamic and spectroscopic imaging; development of novel algorithms to exploit the local, semi-local, and global redundancies in the image data to recover them from fewer measurements; development of algorithms to correct for artifacts associated with the non-idealities of the acquisition scheme.

Dr. Jacob is actively involved in teaching, having taught three sections in 2015-16: Computers in Engineering and Advanced Digital Image Processing. He currently advises eight graduate students in his lab.

He currently has a four articles, as well as a chapter in press, in addition to an impressive 20 papers published in 2015-16.

His active funding includes two NIH grants (R01 and R21), as well as additional grants from the National Science Foundation, American Cancer Society, and the Department of Defense Office of Naval Research.

John Kamholz, MD, PhD, is a Professor in the Department of Neurology, and is the director of the Huntington disease (HD) clinic, where he is involved in a number of neuroimaging studies attempting to identify biomarkers for disease progression. He is currently the PI in two clinical trials for Huntington Disease: SIGNAL, sponsored by the Huntington Study Group to evaluate a monoclonal antibody to the protein Semaphorin 4B; and LE GATO, sponsored by TEVA pharmaceuticals to evaluate the compound liquinimod. He is also the director of an adult Neurogenetics clinic where he is involved in the treatment, genetic diagnosis, and study of the natural history of patients with inherited ataxia syndromes, hereditary spastic parapareses, and other neurogenetic conditions. He is also PI of a project to analyze the neuroimaging, the molecular pathophysiology, and natural history of Pelizaus-Merzbacher disease (PMD), an inherited demyelinating disease of the CNS, work supported by the European Leukodystrophy Association (ELA). This work, as a whole, is designed to provide clinical and neuroimaging data for use in the design of treatment trials for patients with neurodegenerative diseases. He is Principal Investigator on a grant from Vaccinex and a subcontract from the University of Rochester. He has nine publications since 2011.
Wen Liu, PhD, RN, is an Assistant Professor in the College of Nursing, appointed in September 2015. Her productivity for her short duration at Iowa has been substantive, with four national presentations of her work, including posters at the GSA Annual Meeting, the MNRS 40th Annual Research Conference (two presentations) as well as the Honor Society of Nursing. It’s important for AMBI to have her develop a national presence in her area of research. She also has two manuscripts under review and three additional manuscripts published over the last year in peer-reviewed journals. She has remarkable skills in developing interprofessional collaborations and she has displayed superb skills in analytic thought that bode well for her future of academic advancement.

She received a pilot grant from the Csomay Center for Geriatric Nursing Excellence on "Development and Feasibility of Self-Eating Focused Care for Nursing Home Residents with Dementia." She has also received an “Old Gold Summer Fellowship” from the Office of the Provost that will undoubtedly allow her to further refine her research skills.

Nandakumar Narayanan, MD, PhD, is an Assistant Professor in Neurology. Dr. Narayanan has been extremely engaged in all matters of the AMBI and gave an excellent presentation of his ongoing research in the 2015 AMBI and Center on Aging’s Brain in Motion Symposium. Dr. Narayanan published an incredible 11 papers in 2015. Both in volume and the impact factor of his papers’ journals, Dr. Narayanan is a leader among the AMBI faculty. His funding achievements have been equally remarkable. In addition to an R01 and K08 NIH grants, he already held in 2015, he received additional internal grant for approximately $200,000 in 2015-16.

Dr. Narayanan gave several national presentations in 2015 and was a speaker at the Society of Neuroscience mini-symposium. He is on track and is part of the subgroup within AMBI that aims to apply for a larger consortium grant application within 2016.

Priyadarshini Pennathur, PhD, is an Assistant Professor in the Department of Mechanical and Industrial Engineering. Dr. Pennathur’s research program focuses on the impact of technology on human interaction, health care systems models for patient safety and cognitive systems engineering in relation to outcomes in older adults. She was notably honored this year with the 2nd Place Popular Choice Award for her MIE Graduate Student Poster, a reflection of her positive impact in her department. At the national level, she has also demonstrated an impact with her service on the Clinical and Consumer Health-care IT Track for the 2016 Symposium on Human Factors and Ergonomics in Health Care: Improving the Outcomes.

Her teaching activity is highly relevant to older adult outcomes as she is developing a new course in Cognitive Engineering for Spring 2017 as well as developing a new course in Safety Engineering for Fall 2016. She is additionally developing an independent study course (IE 7999) which will offer an independent research study on topics in human factors and patient safety, with emphasis on human errors. In this course, a PhD student in nursing is pursuing an independent study on human factors and healthcare topics, which represents an excellent demonstration of Dr. Pennathur’s interprofessional collaboration – and essential feature of the AMBI program.

Dr. Pennathur is a co-investigator on a pending NIH R01 that examines home medication management for older adults. She also is currently a co-investigator on a funded AHRQ grant and a large CDC grant as well. Further, she is presently the PI on an NIH R00 grant that will continue through August 2016. Her peer-reviewed publication progress has also been exemplary with five research papers published this year.

This remarkable work has identified for the first time that serotonergic signaling can modulate protein quality control mechanisms by activating the heat shock transcription factor, a central modulator of stress responses. This insight became a central theme during our Fall 2015 AMBI retreat and several meetings of faculty interested in this issue have continued to productively occur since that time. Dr. Prahlad has been leading the charge to integrate her worm-based basic research finding with activities of Huntington disease related work in the clinical translation realm. Undoubtedly, Dr. Prahlad has reached a milestone in her research performance that is also clear from her recent grant support news. Not only is Dr. Prahlad already funded through the prestigious Ellison Medical Foundation award through 2017, she has recently received a very fundable priority scores on two new NIH grants, one an R01 (5th percentile) and another an R21 (8th percentile).

In addition to this exemplary progress, Dr. Prahlad has developed her own course on the Molecular Biology of Aging, which will be a fundamental building block for the development of an aging undergraduate major in the next few years.

Michelle Voss, PhD, is an Assistant Professor in the Department of Psychological and Brain Sciences. Dr. Voss has developed into a central hub for much of the AMBI activity around brain imaging. Her talents dramatically strengthen the main focus of AMBI in neuroimaging. Dr. Voss has published an incredible 14 papers in 2015, she is the leading publisher among the AMBI faculty.

In addition to her publication productivity, she has given two national talks in 2015 and is preparing for up for five national/international talks in 2016. Her presentation in last year’s spring AMBI Brain in Motion Symposium was a highlight of the program. Her mentorship accomplishments are also superb, as her students presented a total of 156 posters at various venues and some posters received recognitions. Dr. Voss has four PhD students and her external funding is exemplary. In addition to the four grants in which she is already participating, she has now received her own R21 (2015-17) and is a new Co-I on a second R21 (2015-16) as well as her own internal grant (2016-17).
Jan Wessel, PhD, Assistant Professor in the Department of Psychological and Brain Sciences, as well as Neurology, joined the AMBI in October 2015. In the short time that he has been at Iowa, he has already secured an internal grant of $25,000 in addition to his R03 (2014-16), very good indicators for his future success. Jan has also published two papers as first author, one in Neurobiology of Aging, the other in Frontiers in Psychology. He has had the fastest start in terms of publications and new grant applications of any faculty thus far hired and clearly indicates that Dr. Wessel is likely to become a major driving force for the AMBI.

Dr. Wessel is now heavily engaged in our AMBI faculty discussions and was a major contributor at our Spring retreat.

Kristine Williams, BSN, PhD, is an Associate Professor in the College of Nursing. In 2015, Dr. Williams was appointed Director of the Hartford Center for Geriatric Nursing Excellence at the University of Iowa and is the Sally Mathis Hartwig Professor in Gerontological Nursing. She has been a member of the AMBI since 2013. In 2015 she received the John A. Hartford Award for Gerontological Nursing Leadership from the Midwest Nursing Research Society and became a Certified Dementia Care Mapper.

Dr. Williams has two manuscript in preparation, one under review, two in press, and five papers published in 2015, as well as one book chapter in press. She gave two presentations at international meetings, was invited to give one presentation at the 2015 NIH’s 20th Anniversary Research Symposium and Capitol Hill Exhibition in Washington DC, in addition to numerous local and regional presentations. Her research was also featured in an article published in The Gazette, a regional newspaper, as well as the Mobile Museum for the University of Iowa.

She is the principal investigator on two R01 grants entitled, “Supporting family caregivers with technology for dementia home care (FamTechCare),” and “Changing talk to improve resistiveness to dementia care (CHAT).” She is a Co-investigator on a 2016 AMBI Pilot Grant (Ashida, PI), and was also a PI on an Iowa DHS grant which completed in 2015. She is currently a research mentor to four students for the Undergraduate Honors and Young Scientist programs, some of whom have received awards for their research. She advises two PhD students in 2015-16, and has one postdoctoral fellow. Dr. Williams serves on the NIH Study Section for Health Disparities and Equity Promotion, on the NIH Special Emphasis Panel SRG, as well as an NIH Special Emphasis Panel SRG Study Section on Aging Systems in Geriatrics.
Two AMBI Faculty Retreats Encourage Interdisciplinary Collaboration

In July 2015, we held a retreat at The University Club in the hopes of jump starting some interdisciplinary collaboration between faculty members of the Aging Mind and Brain Initiative. New members were introduced and each member gave a brief “chalk talk about their research.” As a result, two new groups were created in an effort to more finely focus the research: 1) Biomedical Science Group, and 2) Behavioral Science Group.

In January 2016, a follow-up retreat was held on campus at the Melrose Conference Center with a goal of identifying common themes in aging research permitting new collaborative funding applications, not only federal funding, but also leading aging focused non-profits. The outcome of the retreat was the development of two more focused groups, one focused on frailty and the other on Huntington’s. The aim of these groups will be to develop center-type grants focusing on the new NIH format of U19 grant applications.

Dementia
Kanika Arora, Co-lead
Wen Liu, Co-lead
Joe Sample
Ryan Carnahan

Frailty
Gerald Jogerst, Lead
Kanika Arora
Sato Ashida
Nick Butler
Octav Chipara
Bernd Fritzsch
Wen Liu

Huntington’s Disease
John Kamholz, Lead
Kumar Narayanan
Veena Prahlad
Gordon Buchanan
Bernd Fritzsch
Josh Weiner

AMBI Faculty Grad Students Honored with Dissertation Prizes

NEXT GENERATION RAPID MRI TECHNOLOGY

Sajan Lingala’s dissertation, “Novel Adaptive Reconstruction Schemes for Accelerated Myocardial Perfusion MRI,” addresses fundamental slow imaging speed limitations of MRI, and provides tools for rapid MRI technology. He is a graduate student of AMBI faculty member, Mathews Jacob.

While an MRI is a non-invasive procedure, traditionally it has also been slow and complicated, which greatly limits its clinical translational value for a cardiac workup. The rapid MRI tools in Lingala’s dissertation positively impact diagnosis and treatment selection for coronary artery disease, which is associated with many types of cardiovascular disease (CVD).

According to the latest heart and stroke statistics from the American Heart Association, CVD is the leading global cause of death, accounting for 17.3 million deaths per year.

Lingala’s dissertation develops advanced magnetic resonance imaging (MRI) techniques to improve the sensitivity and specificity of myocardial perfusion MRI. Myocardial perfusion MRI is a promising tool to identify cardiac muscle tissues that are “at risk” by measuring the underlying blood flow.
“Lingala produced novel, innovative rapid MRI imaging tools targeted towards enabling whole heart free breathing myocardial perfusion MRI, which was not possible before and has high clinical prognostic value in assessing perfusion defects over the whole heart,” says Mathews Jacob, associate professor of electrical and computer engineering and Lingala’s dissertation advisor. “This reliably identifies sub-endocardial defects—all of which are targeted towards improved diagnosis and management of CAD patients.”

Lingala is working as a postdoctoral research associate in electrical engineering at the University of Southern California.

UNDERSTANDING HOW NEURONS FIND THEIR TARGETS

To gain a better understanding of how sensory and motor neurons navigate to the sensory cells of the inner ear, Karen Thompson experimented on frogs, surgically transplanting their ears. Her dissertation, “Ear Manipulations Help Model Neuroplasticity Limitations,” shares her unique findings.

Transplantation of developing tissues has long been used to test the potential of developing brain tissues to interact with novel targets. While three-eyed frogs were first studied in the 1970s, Thompson’s study extended this work to the inner ear vestibular system by transplanting ears to generate “three-eared” frogs.

By transplanting ears to new locations in the frog or by adding a third ear, Thompson created a novel situation to study how the brain adapts to a new sensory system. In addition, by removing a frog’s existing ear, she examined the influence an established sensory system has on the development of neurons in the brain. Sensory neurons convey sensory impulses from sensory organs toward the central nervous system, which includes the spinal cord and brain.

Her results indicate that vestibular and visual systems appear to use similar molecular and physiological mechanisms to properly integrate information within the brain.

“Karen has in a unique way combined classical transplantation techniques with modern tract tracing and computer assisted 3D reconstruction to analyze the impact of inner ear sensory neurons on the dendritic development of a single identifiable neuron in the frog brain, the Mauthner cell,” says Bernd Fritzsch, professor of biology and Thompson’s dissertation advisor.

Thompson had six publications in 2015, on two of which she was first author. She is continuing her work as a postdoctoral research fellow in biology at the University of Iowa. She was recently awarded a three year R03 grant from NIDCD that will provide her with research support ($100,000 per year). In addition, her work is supported by a NASA base program grant that provides stipends for advanced undergraduate students as well as additional salary and supply support to conduct her research. One goal of her future work with the NASA base program is to implement a training program in a frog model that mimics age-related hair cell loss in hopes that balance can be improved. This could have potential for the oldest old in which falling due to vestibular dysfunction becomes a major health risk.
Two New Associates Join AMBI

Elana Buch, MSW, PhD joined our faculty retreat as an AMBI Associate in January and is anxious to collaborate with the group. She is an Assistant Professor in the Department of Anthropology at the University of Iowa. Dr. Buch received her MSW and PhD from the University of Michigan's Joint Program in Social Work and Social Science, was an NIA and Hartford Foundation pre-doctoral fellow, and was a Social Science in Practice postdoctoral fellow at UCLA. Dr. Buch's research examines the new kinds of intimate relationships that adults forge in later life, including with new romantic partners and paid care workers. She is interested both in how people experience these relationships, how the relationships differ amongst people from different social and economic backgrounds and how they are changing broader understandings of family, intimacy, and the life course. Dr. Buch's first ethnographic project, Staying Alive in America focuses on paid home care, which is the fastest growing occupation in the United States. Drawing on two years of fieldwork with older adults, home care workers and agency staff, Dr. Buch argues that home care practices often sustain elders' independence by capitalizing on social and economic inequality. In her new research, New Love in Later Life, Dr. Buch examines new romantic relationships begun in older age.

Auriel Willette, MS, PhD, is an Assistant Professor in the Departments of Food Science and Human Nutrition and Psychology at Iowa State University. Dr. Willette received his B.A. at Oberlin College in 2002, M.S. and Ph.D. in Psychoneuroimmunology at the University of Wisconsin-Madison in 2010, and completed post-docs in neuroimaging and clinical trials at the University of Wisconsin-Madison School of Medicine and Public Health and the National Institute on Aging. Dr. Willette examines how obesity, dysmetabolism, and neuroinflammation affect brain structure, function, and biochemistry in adults across the Alzheimer’s disease spectrum. MR imaging techniques include volumetrics, DTI, MRS, task and resting state fMRI, and ASL. PET techniques include FDG, PIB, AV45, and tau radioligands. Non-imaging techniques include neuropsychological testing, as well as standard assays and mass spectrometry to associate biomarkers with neuroimaging and behavioral outcomes. Dr. Willette serves on the Veteran’s Administration Neurobiology D section. His research has been highlighted by many national and international outlets, including Reuters, National Public Radio, Yahoo, Science Daily, AAAS, WebMD, the Huffington Post, Fox News, and others. Dr. Willette leads an attempt to better integrate State and UI activities on aging across Iowa.

Aging and Cancer Awardee

Ehab Sarsour, PhD, from Radiation Oncology, was awarded a 2015 Cancer and Aging Pilot Project Award for his project titled, “Fibroblasts age-associated inflammatory responses and cancer cell proliferation.” Dr. Sarsour’s research interest focuses on the molecular mechanisms that regulate regenerative properties of normal and cancer quiescent cells. His research has shown that the antioxidant enzyme manganese superoxide dismutase protects quiescent normal human fibroblast regenerative capacity (chronological life span) by regulating mitochondrial reactive oxygen species and protecting mitochondrial morphology from age associated abnormalities. His work has evolved into examining the molecular mechanisms associated with oxidative stress and inflammation during cellular aging. The scope of his current and future work is to understand how cellular redox status and reactive oxygen species regulate quiescent cells biology in human tissue and their effect on the microenvironment of diseased tissue during aging.
AMBI Associate Buch Receives 2015-16 Collegiate Teaching Award

The College of Liberal Arts and Sciences (CLAS) announced six recipients of the 2015-2016 Collegiate Teaching Awards, one of whom was Elana Buch, an AMBI Associate. The recipients, chosen by the College’s Teaching Awards Committee from nominations by students and colleagues.

"Each of these faculty members is an extraordinary teacher, and I am proud and delighted to recognize their excellence with the Collegiate Teaching Award," said CLAS Dean Chaden Djalali. "Teaching extends beyond classroom instruction—it includes advising, innovating in course development, mentoring in research, and other ways of being a positive role model in students' lives. I thank and congratulate these individuals for their commitment to our academic mission."

Elana Buch, Assistant Professor in the Department of Anthropology, teaches courses of all sizes and at all levels, from large General Education undergraduate lecture courses to intensive graduate field method training. In all of them, she seeks to develop in her students an "anthropological imagination" that pushes them to critically examine life from the profound to the mundane. With a research interest in caregiving and power in later life, she draws on medical anthropology, social work, and feminist anthropology, and seeks to teach skills that will allow students to have an impact on their communities. In 2013, 19 students in her introductory course “Anthropology and Contemporary World Problems" wrote op-eds that were designated as “Public Anthropology Award Winners” by the national Center for a Public Anthropology. Her students regard her as an inspiring and accessible teacher, with one first-generation undergraduate writing, "Dr. Buch created an open and comfortable atmosphere, prompting me to feel motivated to continue on a career path in anthropology. She helped me feel more confident."

New and Improved Website

The Center on Aging unveiled its new website which features its research component, the Aging Mind and Brain Initiative. The website was developed into a more effective means of inspiring collaboration, making it easier for individuals to search for potential collaborators based on a keyword search. The profiles of each AMBI faculty member, AMBI associates, and affiliates of the Center on Aging are also available. The site also offers links to patient care opportunities, a search for Iowa geriatricians, and links to educational opportunities related to geriatrics. Finally it also offers a listing of resources available to patients and caregivers, both locally and nationally. To visit the website click http://aging.uiowa.edu.
Aging Mind and Brain Initiative (AMBI)

2011-2016

The Human Connectome Project, http://www.humanconnectomeproject.org/gallery/