Andrei Irimia, PhD

Associate Professor of Gerontology
Associate Professor of Biomedical Engineering, by courtesy
Associate Professor of Quantitative & Computational Biology, by courtesy
Ethel Percy Andrus Gerontology Center, University of Southern California
This curriculum vitæ was compiled on 12th February 2024 using LaTeX.

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Biographical data

Birthplace Fălticeni, Romania
Citizenship USA, Romania

Research interests

I am a biogerontologist and computational neurobiologist studying how genetics, epigenetics, and environmental factors act on brain aging. My laboratory uses deep learning, genomics, risk models and brain imaging to identify novel risk factors for Alzheimer's disease and related dementias (ADRD). I also study accelerated aging, neurovascular calcification, industrialization, and brain injury as risk factors for ADRD.

Academic employment

2023– **Associate Professor of Gerontology**.
Andrus Gerontology Center, Davis School of Gerontology, University of Southern California

2022– **Courtesy appointment, Department of Quantitative & Computational Biology**.
Irani Hall, Dana & David Dornsife School of Arts & Sciences, University of Southern California

2019– **Courtesy appointment, *Alfred E. Mann* Department of Biomedical Engineering**.
CD Denney Research Center, Viterbi School of Engineering, University of Southern California

2017– **Faculty affiliate, Interdepartmental Neuroscience Graduate Program (NGP)**.
Mentor & admission committee member in an NIH T32 neuroscience training program

2017–2023 **Assistant Professor of Gerontology**.
Andrus Gerontology Center, Davis School of Gerontology, University of Southern California

2013–2017 **Research Assistant Professor of Neurology**.
Department of Neurology, Keck School of Medicine of USC, University of Southern California

2010–2013 **Postdoctoral Scholar**.
Department of Neurology, Geffen School of Medicine, University of California, Los Angeles

2008–2010 **Postdoctoral Fellow**.
Multimodal Imaging Laboratory, Department of Radiology, University of California, San Diego

2003–2007 **Graduate Research Assistant**.
Living State Physics Laboratories, Department of Physics & Astronomy, Vanderbilt University

1999–2002 **Undergraduate Research Assistant**.
Biomagnetism Laboratory, Department of Surgery, Vanderbilt University School of Medicine

Education & training

2010–2013 **Postdoctoral fellowship**, *human neuroimaging*, University of California, Los Angeles.

2008–2010 **Postdoctoral fellowship**, *human brain mapping*, University of California, San Diego.

2004–2007 **Doctor of Philosophy**, *biological physics*, Vanderbilt University, Nashville, Tennessee.

2004–2006 **Master of Science**, *biological physics*, Vanderbilt University, Nashville, Tennessee.

2003–2004 **Master of Science**, *computer science*, Vanderbilt University, Nashville, Tennessee.

1999–2002 **Bachelor of Arts**, *computer science & mathematics*, Lipscomb University, Nashville.

Funding – current

2023–2028 **Principal Investigator**, *NIH Grant R01 AG 079957*, Total costs: $4,122,408.
Interpretable machine learning to synergize brain age estimation and neuroimaging genetics
The time devoted to this project is ∼15%.

2023–2028 **Principal Investigator**, *NIH Grant RF1 AG 082201*, Total costs: $4,038,430.
Neurovascular calcification and ADRD in two nonindustrial Native American populations
The time devoted to this project is ∼15%.

2022–2027 **Site Principal Investigator**, *NIH Grant RF1 AG 054443*, Total costs: $1,320,000.
Testing hypothesized pathways linking infection, physical activity, APOE genotype and biological sex to low dementia prevalence and reduced brain atrophy in two Native American populations
Contact PI: Hillard S. Kaplan, Economic Sciences Institute, Chapman University, Orange CA
The percentage of time devoted to this project is ∼10% annually.

2023–2026 **Co-Investigator**, *DoD Grant CDMRP EP 220064*, Total costs: $880,153.
Individualized prediction of PTE risk and cognitive deficits using connectome analysis and ML
PI: Anand Joshi, Department of Electrical Engineering, University of Southern California
The time devoted to this project is ∼5%.

2022–2027 **Co-Investigator**, *NIH Grant R01 AG 079512*, Satellite total direct costs: $59,850.
The role of sex in GABAergic-mediated, AD-related memory impairments from mid to late life
PI: Teal Eich, Leonard Davis School of Gerontology, University of Southern California.
The percentage of time devoted to this project will be ∼8%.

2017–2023 **Proctor**, *USC Undergraduate Training Program Grant*, Award total costs: $16,500.
USC Undergraduate Research Associates Program to mentor and train young researchers
PI: Julius Glasgow, Assistant Vice Provost of Education, University of Southern California
The percentage of time devoted to this project is 0% annually. These funds from an NIH grant compensate USC undergraduate students who do research in the laboratory.

Funding – completed

2022–2024 **Scientific Consultant**, *National Academy of Neuropsychology*, Total costs: $100,000.
Neuropsychological effects of COVID-19 in older adults from health disparity populations
Contact PI: Vanessa Zizak, Veterans' Hospital Long Beach & University of California, Riverside
The percentage of time devoted to this project was 0% because effort was volunteered.

2021–2023 **Principal Investigator**, *Anonymous Private Foundation Gift*, Total costs: $150,000.
Equipment & instrumentation for traumatic brain injury and Alzheimer's disease research
This private gift donation (0% effort) facilitated purchases of hardware for deep learning.

2017–2023 **Principal Investigator**, *NIH Grant R01 NS 100973*, Total costs: $1,856,250.
Effects of blood-brain barrier disruption on neural connectivity after traumatic brain injury
The percentage of time devoted to this project was ∼10% annually.

2020–2023 **Scientific Consultant**, *NIH Grant R61 NS 120249*, Consulting amount: $30,000.
Advancing secondary data analysis: the ENIGMA brain injury data harmonization initiative
PI: Frank Hillary, Department of Psychology, Pennsylvania State University, State College, PA
Consulting for this project is provided privately. This grant is listed for disclosure purposes only.

2017–2022 **Site Principal Investigator**, *NIH Grant RF1 AG 054443*, Total costs: $2,937,047.
Brain atrophy, cognitive impairment and Alzheimer's disease in a low CVD-risk population
Contact PI: Hillard S. Kaplan, Economic Sciences Institute, Chapman University, Orange CA
The percentage of time devoted to this project was ∼10% annually.

2020–2021 **Principal Investigator**, *Hanson-Thorell Research Scholarship*, Total costs: $25,000.
Neuromelanin in the locus coeruleus as an early biomarker of cognitive decline after TBI
The percentage of time devoted to this project was ∼5% annually. There is no renewal.

2018–2021 **Principal Investigator**, *DoD Contract W81XWH-18-1-0413*, Total costs: $371,250.
TBI-related risk factors for AD: early detection and prognosis via brain imaging and connectomics
The percentage of time devoted to this project was ∼5%/year. There is no renewal mechanism.

2015–2017 **Co-Investigator**, *NIH Grant R44 NS 081792*, Satellite total direct costs: $119,882.
Multi-modality image-based assessment system for traumatic brain injury
PI: John D. Van Horn PhD, School of Data Science, University of Virginia, Charlottesville, VA

2015–2017 **Co-Investigator**, *NIH Grant R01 NS 073983*, Satellite total direct costs: $79,913.
Transforming research and clinical knowledge in traumatic brain injury
PI: Geoffrey Manley MD, Department of Neurosurgery, University of California, San Francisco

2014–2017 **Co-Investigator**, *NIH Grant R01 HD 100028*, Satellite total direct costs: $47,317.
Multimodal neurogenetics of females with autism spectrum disorders
PI: Kevin Pelphrey PhD, Yale University. Subcontract PI: John D. Van Horn PhD, USC

2013–2014 **Co-Investigator**, *NIH Grant U54 EB 005149*, Satellite total direct costs: $494,984.
National Alliance for Medical Image Computing: driving biological project on brain trauma
PI: Ron Kikinis MD, Harvard Medical School. Subcontract PI: John D. Van Horn PhD

2013 **Co-Investigator**, *NIH Grant R41 NS 081792*, Satellite total direct costs: $149,281.
Multimodality image-based assessment system for traumatic brain injury assessment
PI: Stephen Aylward PhD, Kitware Inc. Subcontract PI: John D. Van Horn PhD

Selected honors, awards & achievements

A complete list of all 130 honors and achievements is provided in Appendix A.

2023 Plenary lecture, International Congress of Psychopharmacology (ICP), Antalya, Turkey
2020 Alumnus of the Year, Honors College of Lipscomb University, Nashville, Tennessee
2019 First prize, Frontiers in Traumatic Brain Injury Competition, University College, London
2017 Fellowship, Data Science Rotation for Advancing Discovery, BD2K Training Center
2014 Best Article Award, IEEE Symposium on Biomedical Imaging (ISBI), Beijing, China
2013 Best Article Prize, International Workshop on Brain Image Analysis, Nagoya, Japan
Young Investigator Award, American Society of Clinical Psychopharmacology, Miami
2012 Young Investigator Award, American College of Neuropsychopharmacology, Miami, FL
Mazziotta Prize, Department of Neurology, University of California, Los Angeles
Fellowship, Institute for Cognitive Neuroscience, University of California, Santa Barbara
First prize, Best Connectome Representation, Brain Art Competition, Neuro Bureau
2002 Class salutatorian, winter graduation, Lipscomb University, Nashville, Tennessee

Teaching

Appendix B provides a complete overview of teaching. I have taught 5 courses, some repeatedly, on topics that include the biology of aging, biology of stress, and magnetic resonance imaging. I have taught 5 seminars, some repeatedly, on topics that include technical writing, cinematic exploration of gerontological themes, etc. I have received near-maximum course evaluations.

I have 12 mentees and have served on 10 dissertation committees. Formerly, I mentored 64 trainees at stages ranging from high school to postdoctoral and professional. Many have gone on to graduate or professional programs and to industry & academic careers.

Service

Appendix C provides a complete overview of service activities. I have served on 9 departmental committees and as chairman of one. I have reviewed 50+ grant applications for the NIH (7 study sections), DoD (6 grant mechanisms), VA, NSF, and for 8 foreign grant-making agencies. I have reviewed 170+ manuscripts for 87 journals, and have been a member of 20+ professional societies. I have provided other service to the school, institution, and community as guest editor, invited panelist, reviewer, competition judge, event organizer, debate moderator, community host, etc.

Research – publications

Papers can be browsed at `scholar.google.com/citations?user=IaPx6wIAAAAJ`. Appendix D provides a complete list of publications that includes 88 original journal papers, 26 reviews, 25 conference papers, 5 chapters, 3 theses and a dissertation.

C Yin, PE Imms, M Cheng, A Amgalan, NF Chowdhury, RJ Massett, NN Chaudhari, X Chen, PM Thompson, P Bogdan & **A Irimia** (2023) Anatomically interpretable deep learning of brain age captures domain-specific cognitive impairment *Proceedings of the National Academy of Sciences* vol. 120, article e2214634120, 11 pp.

Research – abstracts & inventions

Appendix E lists over 340 peer-reviewed abstracts and 12 inventions.

Research – presentations

Appendix F provides a complete overview of invited lectures and presentations. I have given 116 invited talks (15 at foreign venues, 32 at domestic venues, and 69 at internal university events).

Research – presentations

Appendix G provides a complete overview of outreach. Engagements with the press include over 840 mass media items in 37 languages, including features in major media venues (33 items), higher education & government media (47 items), in-person interviews (28 items), online press releases (688), online audiovisual features (24 items), book features (15), journal covers (7 items), live TV (8 items), and a book cover.