

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: Vasunilashorn, Sarinnapha

eRA COMMONS USER NAME (credential, e.g., agency login): svasunilashorn

POSITION TITLE: Instructor in Medicine, Harvard Medical School

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	Completion Date MM/YYYY	FIELD OF STUDY
University of California, Los Angeles	B.S.	12/2003	Psychobiology
University of Southern California	Ph.D.	02/2010	Gerontology
Princeton University	Postdoctoral	08/2013	Population Health
Beth Israel Deaconess Medical Center/Harvard Medical School	Postdoctoral	10/2016	Clinical Gerontology

A. Personal Statement

My research has evolved from micro-level approaches studying animal models to macro-level approaches examining human populations. As an undergraduate student, I began my research career in the basic sciences, conducting research on mutations in muscle contraction and antibacterial agents. Conducting bench research sparked my curiosity about how bacterial and animal models inform our understanding of health in human populations. I have since shifted my focus to humans, where I discovered my passion for research on aging as a summer research intern in the Laboratory of Epidemiology, Demography, and Biometry at the National Institute on Aging (NIA) where I completed two projects on late life mobility disability. As a doctoral student in Gerontology at the University of Southern California (USC), my work in population health and aging focused on the relationships among infection, inflammation, and aging. I expanded on this work during my postdoc in the Office of Population Research at Princeton University through my publications on: 1) the genetic and inflammatory correlates of late-life health, and 2) the health consequences of chronic stress.

My current work as a Gerontology T32 and Charles King Trust postdoctoral fellow at Beth Israel Deaconess Medical Center (BIDMC) and Harvard Medical School (HMS) synthesizes my undergraduate training in psychobiology with my graduate and post-graduate work in gerontology and population health. Combining these fields of training has prepared me to apply my previous interests in genetics and inflammatory markers to elucidate the pathophysiology of delirium and its associated long-term cognitive and functional outcomes. Prior to my BIDMC/HMS fellowship and as a population-based researcher, I felt detached from the older adults who I was studying. My fellowship at BIDMC, a major academic teaching hospital where patients, patient care, and patient needs are the focal point of the institution, has reconnected me with the older population whose interactions first ignited my interest in the field of gerontology. During my fellowship at BIDMC/HMS, I have focused my areas of research on: 1) the biological mechanisms of delirium, and 2) delirium severity.

B. Research and/or Professional Experience

Employment:

- 2006,7 Graduate Student Summer Intramural Research Program Intern, Laboratory of Epidemiology, Demography, and Biometry (LEDB), NIA (Jack Guralnik, MD, PhD)
- 2006-10 Graduate Student Researcher, Davis School of Gerontology, University of Southern California (USC) (Eileen Crimmins, PhD; Caleb Finch, PhD)
- 2010-13 Postdoctoral Research Associate, Office of Population Research, Princeton University (Noreen Goldman, DSc)

2013- Postdoctoral Fellow, Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center/Harvard Medical School (Edward Marcantonio, MD, SM)

Honors:

2005-6 Ed & Rita Polusky Scholarship, USC
2005-10 Sigma Phi Omega, Gerontology honor society, USC
2009-10 Phi Kappa Phi, invitational all-discipline honors society, USC
2010 Heinz Osterburg Dissertation Award
2011-13 NIH Loan Repayment Program, National Center on Minority Health and Health Disparities. Project title: Socioeconomic Status and Functional Limitations
2012 University of Miami, Hussman Institute for Human Genomics Scholarship to attend the Genetic Analysis of Complex Human Diseases summer course
2012 University of Alabama at Birmingham, School of Public Health and Department of Biostatistics to attend the Statistical Genetics and Genomics summer course
2014 American Geriatrics Society/NIA travel award to attend the U13 AG039151 Conference Series in Geriatrics from Bedside to Bench – Delirium in Older Adults: Finding Order in the Disorder
2014- NIH Clinical Loan Repayment Program. Project title: Identifying the Genetic and Inflammatory Mechanisms of Postoperative Delirium and its Long-Term Cognitive and Functional Outcomes
2015 Center of Excellence for Delirium in Aging: Research Training, and Educational Enhancements (CEDARTREE) Best Delirium Paper Award for manuscript entitled, “Cytokines and postoperative delirium in older patients undergoing major elective surgery.”

Professional Societies and Public Advisory Committees:

Association Memberships

2006- Gerontological Society of America
2007- Population Association of America
2012- American Society of Human Genetics
2014- American Geriatrics Society
2014- American Delirium Society
2015- Alzheimer’s Association International Society to Advance Alzheimer’s Research and Treatment

C. Contributions to Science

1. Infection, Inflammation, and Aging: My graduate research contributions at USC focused on understanding how living in a high infection environment with little access to modern medicine influences health. In my dissertation work, I reported three distinct, but inter-related findings: 1) aging in a forager-farmer population in lowland Bolivia is characterized by lower cardiovascular risk and higher levels of infection and inflammation than industrialized countries (ref a); 2) an inverse relationship exists between inflammation and blood lipid levels (ref b); and 3) variable relationships between genetic marker apolipoprotein E (ApoE) and inflammation were observed (ref c). These findings challenged our current framework on aging and health that is largely based on evidence from industrialized populations; I concluded that profiles of late life health and aging are markedly different in pre-industrialized societies. A paper published during my postdoctoral fellowship at Princeton extended my work at USC by examining the association between ApoE, blood lipids, and inflammation (ref d).

- a. Gurven M., Kaplan H, Winking J, Eid Rodriguez D, **Vasunilashorn S**, Kim JK, Finch C, Crimmins E. Inflammation and infection do not promote arterial aging and cardiovascular disease risk factors among lean horticulturalists. *PLoS One* 2009;4:e6590. PMID: PMC2722089.
- b. **Vasunilashorn S**, Crimmins EM, Kim J, Winking J, Gurven M, Kaplan H, Finch, CE. Blood lipids, infection, and inflammatory markers in the Tsimane of Bolivia. *Am J Human Biol* 2010;22:731-740. PMID: PMC3537506.
- c. **Vasunilashorn S**, Finch CE, Crimmins EM, Vikman SA, Stieglitz J, Gurven M, Kaplan H, Allayee H. Inflammatory gene variants in the Tsimane, an indigenous Bolivian population with a high inflammatory load. *Biodemography Soc Biol* 2011;57:33-52. PMID: PMC3529658.
- d. **Vasunilashorn S**, Gleib DA, Lan C-Y, Brookmeyer R, Weinstein M, Goldman N. Apolipoprotein E is associated with blood lipids and inflammation in Taiwanese older adults. *Atherosclerosis* 2011;219:349-354. PMID: PMC3225086.

2. Correlates and Consequences of Stress: My second line of research established a new series of studies on the consequences of stress. One project demonstrated that perceived stress is predictive of all-cause mortality in late life, with an attenuated effect when perceptions of health are excluded (ref a). A second project illustrated that exposure to stressors in late life increases while perceived stress decreases over the same time, and with the exception of health-related stressors, change in exposure to stressors is not associated with change in perceptions of stress (ref b). A third manuscript reported on the health consequences of widowhood in late life (ref c). A fourth paper shifted focus to the biological correlates of stress and reported an association between short telomere length and inflammatory cytokine interleukin (IL)-6, as well as a summary measure of anabolic and catabolic analytes (ref d).

- a. **Vasunilashorn S**, Gleib DA, Weinstein M, Goldman N. Perceived stress and mortality in a Taiwanese older adult population. *Stress* 2013;16:600-6. PMID: PMC44441339.
- b. **Vasunilashorn S**, Lynch SM, Gleib DA, Weinstein M, Goldman N. Exposure to stressors and trajectories of perceived stress among older adults. *J Gerontol B Psychol Sci Soc Sci* 2015;70:329-37. PMID: PMC4415078.
- c. Choi KH,* **Vasunilashorn S**.* (co-first) Widowhood, age heterogamy, and health: the role of selection, marital quality, and health behaviors. *J Gerontol B Psychol Sci Soc Sci* 2014;69:123-34. PMID: PMC3894121.
- d. **Vasunilashorn S**, Cohen AA. Stress responsive biochemical anabolic/catabolic ratio and telomere length in older adults. *Biodemography Soc Biol* 2014;60:174-84. PMID: PMC4347836.

3. Biological Mechanisms of Delirium: My current work as a T32 postdoctoral fellow at BIDMC/HMS is focused on identifying the genetic and inflammatory mechanisms of postoperative delirium. One manuscript reports on the absence of an association between ApoE and postoperative delirium in the largest, most well-characterized sample of older surgical patients without dementia (ref a). A second paper aimed to discover a biomarker signature of delirium, and reported an association between IL-6 and postoperative delirium, with a potential role for IL-2 (ref b). A third manuscript used a proteomics approach in a matched, case-control study design that identified C-reactive protein (CRP) as the top protein associated with delirium (ref c). A fourth paper extends the CRP findings from the proteomics approach (in ref c) to examine the relationship between CRP and delirium incidence, duration, and intensity in the full study cohort (ref d).

- a. **Vasunilashorn SM**, Ngo L, Kosar CM, Fong TG, Jones RN, Inouye SK, Marcantonio ER. Does Apolipoprotein E genotype increase risk of postoperative delirium? *Am J Geriatr Psychiatry* 2015;23:1029-37. PMID: PMC4591079.
- b. **Vasunilashorn SM**,* Ngo L,* (co-first) Inouye SK, Jones RN, Alsop D, Guess J, Jastrzebski S, McElhaney J, Kuchel G,** Marcantonio ER.** (co-last) Cytokines and postoperative delirium in older patients undergoing major elective surgery. *J Gerontol A Biol Sci Med Sci* 2015;70:1289-95. PMID: PMC4817082.
- c. Dillon ST,* **Vasunilashorn SM**,* (co-first) Ngo L, Otu H, Inouye SK, Jones RN, Alsop DC, Kuchel GA, Marcantonio ER,** Libermann TA.** (co-last) Higher C-reactive protein levels predict postoperative delirium in older patients undergoing major elective surgery: A longitudinal nested case-control study. *Biol Psychiatry* 2017;81:145-153. PMID: PMC5035711.
- d. **Vasunilashorn SM**, Dillon ST, Inouye SK, Ngo LH, Fong TG, Jones RN, Trivison TG, Schmitt EM, Alsop DC, Freedman SD, Arnold SE, Metzger ED, Libermann TA, Marcantonio ER. High C-reactive protein predicts delirium incidence, duration, and severity after major non-cardiac surgery. Under review.

4. Delirium Severity: A recent and fourth major emphasis of my career aims to quantify the severity of delirium and its association with clinical outcomes. One manuscript examined the link between multiple delirium episode severity measures and hospital-related outcomes and found that the sum of delirium severity scores across all hospital days was the most predictive measure (ref a). A second paper derived and validated a delirium severity scoring method for a brief diagnostic assessment (ref b). A third paper evaluated delirium severity and cognitive trajectories over a 36-month follow-up period, and found a dose-response relationship between increasing delirium severity and more rapid rates of cognitive decline (ref c).

- a. **Vasunilashorn SM**, Marcantonio ER, Gou Y, Pisani M, Trivison TG, Schmitt EM, Jones RN,** Inouye SK.** (co-last) Quantifying the severity of a delirium episode throughout hospitalization: The combined importance of intensity and duration. *J Gen Intern Med* 2016;31:1164-71. PMID: PMC5023588.
- b. **Vasunilashorn SM**,* Guess J,* (co-first) Ngo L, Fick D, Jones RN, Schmitt E, Kosar CM, Saczynski JS, Trivison TG, Inouye SK,** Marcantonio ER.** (co-last) Derivation and validation of a severity scoring

method for the 3-Minute Diagnostic Interview for CAM-defined Delirium (3D-CAM). *J Am Geriatr Soc* 2016;64:1684-9. PMID: PMC4988867.

- c. **Vasunilashorn SM**,* Fong TG,* (co-first) Albuquerque A, Marcantonio ER, Schmitt EM, Tommet D, Gou Y, Trivison TG, Jones RN,** Inouye SK.** (co-last) Delirium severity post-surgery and its relationship with long-term cognitive decline in older patients without dementia. Under review.

Complete List of Published Work in NCBI (total of 37 papers):

<https://www.ncbi.nlm.nih.gov/sites/myncbi/sarinnapha.vasunilashorn.1/bibliography/41639035/public/?sort=date&direction=ascending>.

D. Research Support

On-going Research Support

The Medical Foundation Sarinnapha Vasunilashorn (PI) 09/01/15-08/31/17

Charles King Trust Postdoctoral Research Fellowship

The goal of the fellowship is to support and promote the investigation of human disease and alleviation of human suffering through improved treatment. As a postdoctoral fellow, I am examining the role of neuronal injury as a mediator of postoperative delirium and long-term cognitive and functional outcomes in older patients undergoing major elective surgery.

Role: Postdoctoral Fellow

Completed Research Support

T32 AG003727 Eileen Crimmins (PI) 08/15/06-08/14/09

NIA Multidisciplinary Research Training in Gerontology

The goal of this Ruth L. Kirschstein National Research Service Award is to train predoctoral and postdoctoral researchers to work within their disciplines and also incorporate methods and approaches from other fields relevant to understanding physical and mental health changes with aging. As a predoctoral fellow, my projects focused on: 1) biomarkers that change with age; and 2) associations between inflammation and blood lipid levels in a population of forager farmers in lowland Bolivia with little access to modern medicine.

Role: Predoctoral Research Fellow

USC 08/15/09-05/14/10

Oakley Fellowship

The Oakley fellowship provides support for six promising USC PhD students in any discipline to conduct research. This funded my final year of graduate school, during which I examined the association between genetics and inflammatory markers in a forager farmer population in lowland Bolivia.

Role: Predoctoral Fellow

R01 AG016790 Noreen Goldman (PI) 09/01/10-8/25/13

Biodemography of Health, Social Factors, and Life Change

The goal of this study is to elaborate the relationships among social environment, life challenges, and health in an older Taiwanese population. As a postdoctoral research associate, I completed several projects that examined: 1) the association of genetics and late life health outcomes including mortality and physical function; and 2) the correlates and consequences of perceived and experienced stress.

Role: Postdoctoral Research Associate

T32 AG023480 Lewis Lipsitz (PI) 08/26/13-08/25/15

NIA Translational Research in Aging Training Program

The goal of this Ruth L. Kirschstein National Research Service Award is to provide educational opportunities to postdoctoral fellows and predoctoral candidates, with the overarching aim of promoting the translation of basic research findings to interventions that will improve the well-being and quality of life of older adults. As a postdoctoral fellow, I completed projects: 1) investigating the genetics of postoperative delirium; 2) examining the inflammatory correlates of delirium; and 3) measuring delirium severity and its association with clinical outcomes.

Role: Postdoctoral Research Fellow