BIOGRAPHICAL SKETCH

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NAME: Oleson, Jacob J.

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

POSITION TITLE: Professor

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 *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Central College	B.A.	1997	Mathematics
University of Missouri – Columbia	M.A.	1999	Statistics
University of Missouri – Columbia	Ph.D.	2002	Statistics

A. Personal Statement

B. Positions and Honors

Positions and Employment

2002-2004 Assistant Professor, Dept. of Math and Statistics, Arizona State University, Tempe, AZ
2004-2012 Assistant Professor, Dept. of Biostatistics, University of Iowa, Iowa City, IA
2012-2018 Associate Professor, Dept. of Biostatistics, University of Iowa, Iowa City, IA
2014-present Director, Center for Public Health Statistics, College of Public Health, University of Iowa
2015-present Director of Graduate Studies, Dept. of Biostatistics, University of Iowa, Iowa City, IA
2018-present Professor, Dept. of Biostatistics, University of Iowa, Iowa City, IA

Honors

2008 Thank a Teacher Note of Appreciation, Center for Teaching
2009 One of the Best 2008 Audiology Literature: Cochlear Implants
2012 Faculty Teaching Award, College of Public Health
2012 Top Cited Paper Impact Factor for 2011, Audiology & Neurotology
2013 2012 ASHA Editor's Award for the American Journal of Audiology, American Speech-Language-Hearing Association
2013 Thank a Teaching Note of Appreciation, Center for Teaching
2015 Elected to Delta Omega (Public Health Honor Society)
2016 Special Recognition Award to the Outcomes in Children with Hearing Loss Supplement, Editors of Ear and Hearing

Professional Memberships

American Statistical Association
Institute of Mathematical Statistics
International Biometric Society (ENAR)
American Cochlear Implant Alliance

C. Contributions to Science

I am the lead biostatistician for the Cochlear Implant Research Center at the University of Iowa. The University of Iowa has been at the forefront of cochlear implant research for more than three decades. My role for this research center is to oversee research design, implementation, analysis, and interpretations. I work closely with all team members on the cochlear implant research studies. The sample sizes in many of these analyses are typically very small with multiple observations per subject. I use standard statistical methodology in these collaborations including t-tests, correlations,

regressions, ANOVA, linear mixed models, generalized linear mixed models, and multiple imputation, as well as develop new techniques where the need arises. Modern cochlear implants preserve residual acoustic hearing during the implantation giving individuals with higher levels of pre-operative residual hearing the ability to be implanted with this remarkable device. This not only improves hearing of speech and language, but the ability to hear of music, and it leads to better cognitive processing ability as we have shown in our research.

- Gfeller K, Turner C, Oleson J, Zhang X, Gantz B, Froman R, Olszewski C. (2007) Accuracy of cochlear implant recipients on pitch perception, melody recognition, and speech reception in noise. *Ear and Hearing, 28*(3), 412-423. PMID: 17485990
- Gantz BJ, Hansen MR, Turner CW, Oleson JJ, Reiss LA, Parkinson AJ. (2009) Hybrid 10 clinical trials: Preliminary results. *Audiology and Neurotology, 14*(1), 32-38. PMID: PMC3010181
- Gfeller KG, Oleson JJ, Knutson JF, Breheny P, Driscoll V, Olszewski C. (2008) Multivariate predictors of music perception and appraisal by adult cochlear implant users. *Journal of the American Academy of Audiology, 19*(2), 120-134. PMID: PMC2677551
- Woodson EA, Dempewolf RD, Gubbels SP, Porter AT, Oleson JJ, Hansen MR, Gantz BJ. (2010) Long-term hearing preservation following microsurgical excision of vestibular Schwannoma. *Otology and Neurotology, 31*(7), 1144-1152. PMID: 20679955

I collaborate extensively with researchers in speech and language development. Again, I work closely with all research team members on study design, implementation, analysis, and reporting of results. It was recognized that research on children who are hard of hearing was lacking, and that a study comparing various aspects of development of hard of hearing children against normal hearing children and children wearing cochlear implants was needed. This work has validated the effectiveness of newborn screening and the importance of timeliness in follow-ups. The work has also shed light on hearing aid fittings, consistency of hearing aid use, accuracy of parent reports of hearing aid use, risk and resilience in speech and language, and early literacy skills. The work is leading to a “best practice” guide for clinicians and service providers around the nation.

- Tomblin JB, Harrison M, Ambrose SE, Walker EA, Oleson JJ, Moeller MP. (2015) Language outcomes in young children with mild to severe hearing loss. *Ear and Hearing* 36, 76S. PMCID: PMC4704115, PMID 26731161.
- Holte L, Walker E, Oleson JJ, Spratford M, Moeller MP, Roush P, Tomblin JB. (2012) Factors influencing follow-up to newborn hearing screening for infants who are hard-of-hearing. *American Journal of Audiology, 21*, 163-174. PMC: PMID: 22585937, PMID: PMC3435452
- Dunn CC, Walker EA, Oleson JJ, Kenworthy M, Van Voorst T, Tomblin JB, Ji H, Kirk KI, McMurray B, Hanson M, Gantz BJ. (2014) Longitudinal speech perception and language performance in pediatric cochlear implant users: The effect of age at implantation. *Ear and Hearing, 35*(2), 148-160. PMC: PMC3944377, PMID: 24231628
- Tomblin JB, Oleson JJ, Ambrose S, Walker E, Moeller M. (2014) The Influence of Hearing Aids on Speech and Language Development in Children with Hearing Loss. *Journal of the American Medical Association: Otolaryngology, 140*(5), 403-409. PMC: 24700303

My work in Bayesian spatio-temporal models has primarily been geared towards sparse data, which include excessive zero values and mission data. The conditional auto-regression (CAR) models relate similar regions on a spatial scale. I showed how the CAR model is beneficial along with an autoregressive temporal function when the data are sparse, including zero counts. We illustrated the method using turkey hunting success rates per county in Missouri (Oleson and He, 2004). Additional work integrated spatio-temporal modeling into survey statistics and small area estimation to pool strength by considering spatial priors for categorical response data with data that were not missing at random. This work was extended to survey nonresponse with a multiple wave survey approach using a multinomial response outcome when follow-up surveys are sent multiple times to those who haven’t responded. Furthermore, we developed an analysis framework when the sampling design differs from the study domains (Oleson et al, 2007). Bayesian spatio-temporal models are naturally suited for air quality modeling. The paper Oleson, Kumar, and Smith (2013) focuses on spatio-temporal models that relate Aerosol Optical Depth (AOD) with particulate matter (PM), and determining aspects of AOD related to health and what aspects are not directly related.

- Oleson JJ, He CZ. (2004) Space-time modeling for the Missouri Turkey Hunting Survey. *Environmental and Ecological Statistics, 11*, 85-101.
- Oleson JJ, He CZ, Sun D, Sheriff S. (2007) Bayesian estimation in small areas when the sampling sub-domain differs from the study sub-domain. *Survey Methodology, 33*, 173-186.
- Oleson JJ, Kumar N, Smith BJ. (2013) Spatio-temporal modeling of irregularly spaced Aerosol Optical Depth data. *Environmental and Ecological Statistics, 20*(2), 297-314.
- Porter AT, Oleson JJ. (2014) A Multivariate CAR Model for Mismatched Lattices. *Spatial and Spatio-temporal Epidemiology, 11*, 79-88.

My work in infectious diseases has centered around modeling and predicting the spread of infectious diseases over both space and time. The paper by Oleson and Wikle (2013) predicted the potential for an avian flu outbreak such the 2015 outbreak in northwest Iowa. The work dealt with sparse data and excessive zero counts using dimension reductions

involving a two-step process of empirical orthogonal functions. In addition to this work, spatial SEIR models are promising in their ability to predict spread and control for interventions of various types. Traditional SEIR models assume a population averaged exponential decay function for the rate of change in the latent and infectious periods. In Porter and Oleson (2013), we showed how to relax the exponential decay function using a path-specific SEIR Bayesian hierarchical model that also has the ability to handle vaccinations and other intervention types. Then, Porter and Oleson (2014) extended the path specific work to include spatio-temporal structure. Brown, Oleson, and Porter (2015) created an empirically adjusted reproductive number that gives more realistic and time specific information on the reproductive number than was previously available.

- Oleson JJ, Wikle CK. (2013) Predicting Infectious Disease Outbreak Risk Via Migratory Waterfowl Vectors. *Journal of Applied Statistics, 40*(3), 656-673.
- Porter AT, Oleson JJ. (2013) A path-specific SEIR model for use with general latent and infectious distributions. *Biometrics, 69*(1), 101-108. PMC: PMC3622117, PMID: 23323602
- Porter AT, Oleson JJ. (2014) A Spatial Epidemic Model for Disease Spread Over Heterogeneous Spatial Support. *Statistics in Medicine*, 35(5), 721-733. PMID: 26365804.
- Brown G, Oleson JJ, Porter AT (2015) An Empirically Adjusted Approach to Reproductive Number Estimation for Stochastic Compartmental Models: A Case Study of Two Ebola Outbreaks. *Biometrics*, 72(2), 335-343. PMID: 26574727.

I am the Director of the Center for Public Health Statistics (CPHS) and have been involved with CPHS activities for the past 14 years. During that time, I produced the biennial Iowa Health Fact Book in 2005, 2007, and 2009 and in 2015 led the transition into the online production of the Iowa Health Fact Book. This book is used by public health practitioners and professionals throughout the state of Iowa to learn more about the public health status of various health aspects for their county. This work that is conducted in partner with the Iowa Department of Public Health is just one of many important activities that CPHS engages in with IDPH.

- Oleson JJ, Breheny PJ, Pendergast JF, Ryan S, Litchfield RE, Myers-Geadelmann J. (2008) Impact of travel distance on WISEWOMAN intervention attendance for a rural population. *Preventive Medicine, 47*, 565-569. PMID: 18672000

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research

No Contract #: IPA-VA Oleson MOU 04/01/14-03/31/19
DOD/Iowa City Veterans Affairs Research Foundation
Cochlear Implants
PI: Hanson, Marlan
Role: Contact PI
CDC RFA-DD14-001, Surveillance and Research of Muscular Dystrophies and Neuromuscular Disorders, Component A: Core (Existing MD Surveillance and Research Programs).

Contract #5888NB90 08/01/95-06/29/21
Iowa Department of Public Health
IDPH FY19 Screening Data Management
PI: Oleson, Jacob (subcontract)
Breast and Cervical Cancer Early Detection Program, Data and Entry Analysis; WISEWOMAN Enhanced Design, Data Entry and Analysis; Data Management subcontract. Subcontract studies design, data management, and analysis on this project.

P50 DC000242 09/09/85-11/30/22
NIH-NIDCD
Iowa Cochlear Implant Clinical Research Center Project VII
PI: Gantz, Bruce
Role: Co-Investigator
Grant funds allow researchers to continue to identify the factors that determine why some individuals benefit to a greater extent from the implant than others. In addition, researchers work to develop and evaluate new signal processing for speech perception and music appreciation and to study the expansion of selection criteria including adults with more hearing and to track the benefit of early implantation in infants.

R01 TW010500 07/20/16-06/30/21
NIH
Epidemic Modeling Framework for Complex, Multi-Species Disease Processes and the Impact of Vertical and Vector Transmission: A Study of Leishmaniasis in Peri-Urban Brazil
PI: Oleson, Jacob
Role: PI
Despite knowledge of vertical transmission for multiple infectious diseases for at least three-quarters of a century, we do not know how vertical transmission impacts the basic reproductive number (R0) of classically vector-borne infections. In addition, multi-species diseases are likely to persist through both vertical and horizontal transmission, and not enough is known about their collective impact on R0. Vertical transmission of VL was previously discounted, but this EEID collaborative group has demonstrated that vertical transmission maintains endemic canine VL within US hunting hounds (6). We use this unique cohort to measure the infective capacity of vertical transmission in VL. With understanding gained from this study, we will be able to interpret how vertical transmission and horizontal transmission impact R0 separately, and we will quantify their interactive effect on R0.

R21 DC015832 07/01/17-06/30/20
NIH
Mechanisms of Listening Effort in School Age Children who are Hard of Hearing
PI: Walker, Elizabeth (contact PI)
Role: Co-Investigator

96441-A 01/23/12-06/30/22
Father Flanagan's Boys Home
The Dynamics of Word Learning in Children with Developmental Language Impairment
PI: Oleson, Jacob
Role: PI
The prime PI Karla McGregor was faculty at UI for years 1-5 of this project (NIH Word Learning & Memory project). This subaward is for years 6-10 of the project. The long-term goal of this research program is to develop a full explanation of the vocabulary problems associated with developmental language impairment (LI).

U01 DD001223 09/01/18-08/31/23
CDC
Iowa CBDRP: Component A BD-STEPS II Core
PI: Romitti, Paul (Contact PI)
Role: Co-Investigator
The purpose of this NOFO is to identify causes of certain major, structural birth defects using epidemiologic and genetic research methods and to provide information that could be translated into public health prevention messages. Component A. BD-STEPS II Core. To support the epidemiological and genetic research capabilities of the Centers for Birth Defects Research and Prevention (CBDRP) through the Birth Defects Study To Evaluate Pregnancy exposureS (BD-STEPS). BD-STEPS is a case/control study of genetic and environmental risk factors for birth defects that focuses on the key areas of: (1) maternal chronic diseases and their treatments; (2) infectious disease in pregnancy; and (3) medications.

R01 DC015997 05/01/18-04/30/23
NIH
Cost Effective Hearing Aid Delivery Models: Outcomes, Value, and Candidacy
PI: Wu, Yu-Hsiang
Role: Co-Investigator
Age-related hearing loss is a substantial national problem due to its high prevalence and significant psychosocial consequences. Although hearing aids (HAs) are the primary intervention for the management of age-related hearing loss, only 15-30% of those who could benefit from HAs actually seek them out. The overall goal of this project is to characterize the differential effect of service-delivery models on provision of amplification so that accessible and affordable hearing healthcare can be facilitated. This project proposes to conduct research that would provide new knowledge about the outcome, value, and candidacy of OTC, hybrid, and AUD models and the effect of professional evaluation/selection services, patient-centered services, and device-centered services on outcome and value. The proposed study will acquire this knowledge through a two-site, double-blinded, randomized controlled field trial. The results obtained will inform patients and hearing healthcare providers about what can be achieved with different service-delivery models, and will help us develop guidelines to facilitate the selection of the most appropriate and cost-effective intervention for a particular patient. The significance of the proposed project from the public health point of view is that it will facilitate not only accessible and affordable, but also quality, hearing healthcare.

R25 HL147231 03/01/19-02/28/22
NIH
Iowa Summer Institute for Research Education in Biostatistics (ISIREB)
PI: Zamba, Gideon
Role: Co-Investigator
This is a proposal to the National Institutes of Health (NIH), National Heart, Lung and Blood Institute (NHLBI), from the University of Iowa, in response to RFA-HL-19-019 for an Iowa Summer Institute for Research Education in Biostatistics (ISIREB), Summer Programs 2019, 2020, & 2021.

R01 DC008089 1/8/07-11/30/23
NIH
The Development of Real Time Spoken and Written Word Recognition: Cognitive Bases of Language and Educational Outcomes
PI: McMurray, Robert M.
Role: Co-Investigator

Completed Research

96399-A 12/01/13-11/30/18
Father Flanagan's Boys Home
Complex Listening Skills in School-Age Hard of Hearing Children
PI: McCreery, Ryan, Walker, Elizabeth (contact PI)
Biostatistician: Oleson, Jacob
The grant will help UI researchers, along with colleagues at Boys Town National Research Hospital in Nebraska and the University of North Carolina, explore whether educational and audiological services and aids can improve outcomes for young children with mild and moderate hearing disorders.

R25 HL131467 02/15/16-01/31/19
NIH
Iowa Summer Institute for Research Education in Biostatistics
PI: Zamba, Gideon
Mentor: Oleson, Jacob
This is a proposal to the National Institutes of Health (NIH), National Heart, Lung and Blood Institute (NHLBI), from the University of Iowa, in response to RFA-HL-16-017 for a Summer Institute for Research Education in Biostatistics. The ultimate vision of our proposed research education program is to increase the number of undergraduates who enter graduate programs in Biostatistics and to maintain a solid underrepresented minority pipeline into biostatistics graduate programs. The proposal is for the University of Iowa (UI) Department of Biostatistics to recruit a diverse group of 18 trainees each year, from 2016 to 2018, with focus on minority, underrepresented and disadvantaged students who wouldn't have otherwise been exposed to the field of biostatistics.