OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

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: Haaland, Benjamin

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

POSITION TITLE: Associate Professor, Department of Population Health Sciences, University of Utah

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 DateMM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Montana State University, Bozeman | BS | 05/2003 | Applied Mathematics |
| Montana State University, Bozeman | MS | 05/2006 | Statistics |
| University of Wisconsin-Madison | PhD | 08/2010 | Statistics |

**A. Personal Statement**

Benjamin Haaland, PhD, is Co-Director of the Cancer Biostatistics Shared Resource at Huntsman Cancer Institute and an Associate Professor in the Department of Population Health Sciences. Dr. Haaland has substantial expertise in design and analysis of randomized controlled trials, evidence synthesis and meta-analysis, non-parametric modeling of longitudinal and multi-level data, and applications of modern machine learning techniques to predictive health. His methodological strengths include functional data analysis, experimental design, and complex meta-analyses. He has co-authored more than 80 peer-reviewed publications, spanning clinical science, health services, population health, and statistical methods, with a major emphasis on cancer.

Currently, Dr. Haaland is involved in a broad spectrum of collaborative and methodological projects including a) comparative effectiveness of cancer therapies based on real-word electronic health record data, b) describing the factors contributing to low-value PSA screening, c) development of accurate and parsimonious machine learning predictive models for both pediatric diarrheal etiology based on clinical presentation and response to heart failure therapy based on clinical covariates and mRNA expression levels, and d) developing accurate and computationally feasible non-parametric regression techniques, with appropriate uncertainty quantification, in the context of emulation of large-scale and high-dimensional computer simulations. He has been the main quantitative investigator on more than 20 funded research grants which he helped to design and write. Dr. Haaland is currently advising 2 PhD students, and has graduated 5 PhD students since 2016.

**B. Positions and Honors**

**Employment**

**2010-2014 Assistant Professor, Centre for Quantitative Medicine, Duke-NUS Graduate Medical School, Singapore**

**2014-present Assistant Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology**

**2017-present Associate Professor,** Department of Population Health Sciences, Division of Biostatistics, University of Utah

**2018-present Co-Director, Cancer Biostatistics Shared Resource, Huntsman Cancer Institute**

**Other Experience**

**2008 Summer Intern, IBM TJ Watson Research Center, Yorktown Heights, NY**

**2009 Summer Intern, Eli Lilly and Company, Indianapolis, IN**

**2007-2010 NIH Biostatistics Trainee,** University of Wisconsin-Madison

**Honors**

**2014 Best Research Paper Award, Singapore Medical Journal**

**2011 Most Knowledgeable Faculty for Research, Faculty Appreciation Awards, Duke-NUS**

**2007 PhD Qualifying Exam Top Score, Department of Statistics,** University of Wisconsin-Madison

**2006 Outstanding Master’s Student Award, Department of Mathematical Sciences, Montana State University, Bozeman**

**C. Contributions to Science (*mentees indicated in italics*)**

1. **Design and Analysis of Randomized Clinical Trials: I have a keen research interest both in designing clean, well-power randomized trials, which are executable and provide top grade evidence on the main hypotheses as well as a rich testbed for exploratory hypotheses. A sampling of relevant publications is below.**
	1. Leung, Y.Y., **Haaland, B.**, Huebner, J.L., Wong, S.B.S., Tjai, M., Wang, C., Chowbay, B., Thumboo, J., Chakraborty, B., Tan, M.H. and Kraus, V.B., 2018. Colchicine lack of effectiveness in symptom and inflammation modification in knee osteoarthritis (COLKOA): a randomized controlled trial. *Osteoarthritis and cartilage*. PMID:29426008.
	2. Finkelstein, E.A., **Haaland, B.**, Bilger, M., Sahasranaman, A., Sloan, R.A., Nang, E.E.K. and Evenson, K.R., 2016. Effectiveness of activity trackers with and without incentives to increase physical activity (TRIPPA): a randomised controlled trial. *The Lancet Diabetes & Endocrinology*, *4*(12), pp.983-995. PMID:27717766.
	3. *Aftab, S.A.*, Tay, K.H., Irani, F.G., Lo, R.H.G., Gogna, A., **Haaland, B.**, Tan, S.G., Chng, S.P., Pasupathy, S., Choong, H.L. and Tan, B.S., 2014. Randomized clinical trial of cutting balloon angioplasty versus high-pressure balloon angioplasty in hemodialysis arteriovenous fistula stenoses resistant to conventional balloon angioplasty. *Journal of Vascular and Interventional Radiology*, *25*(2), pp.190-198. PMID: 24315548
2. **Application of Modern Machine Learning Techniques in Medical Research: I am very interested in applying cutting-edge predictive modeling and machine learning techniques in a medical setting. These type of predictive models can be appropriate for diagnosis, triage, and risk assessment. A sampling of relevant publications is below.**
	1. Sloan, R.A., **Haaland, B.**, Sawada, S.S., Lee, I.M., Sui, X., Lee, D.C., *Ridouane, Y.*, Müller-Riemenschneider, F. and Blair, S.N., 2016. A fit-fat index for predicting incident diabetes in apparently healthy men: a prospective cohort study. *PLoS One*, *11*(6), p.e0157703. PMCID: PMC4920380.
	2. Nongpiur, M.E., **Haaland, B.**, Friedman, D.S., Perera, S.A., He, M., *Foo, L.L.*, Baskaran, M., Sakata, L.M., Wong, T.Y. and Aung, T., 2013. Classification algorithms based on anterior segment optical coherence tomography measurements for detection of angle closure. *Ophthalmology*, *120*(1), pp.48-54. PMID: 23009888.
	3. Ong, M.E.H., *Goh, K.*, Fook-Chong, S., **Haaland, B.**, Wai, K.L., Koh, Z.X., Shahidah, N. and Lin, Z., 2013. Heart rate variability risk score for prediction of acute cardiac complications in ED patients with chest pain. *The American journal of emergency medicine*, *31*(8), pp.1201-1207. PMID: 23763936.
3. **Evidence Synthesis and Comparative Effectiveness of Cancer Treatments: A large portion of my applied research has focused on quantitatively synthesizing evidence related to tailoring cancer therapies to specific patients. This work provides concise, quantitative information to assist oncologists in recommending the best possible therapy for each patient. A sampling of relevant publications is below.**
	1. Aguiar P.N., **Haaland B**., Park W., Tan P.S., del Giglio A., de Lima Lopes G. Cost-effectiveness of Osimertinib in the First-Line Treatment of Patients With *EGFR*-Mutated Advanced Non–Small Cell Lung Cancer. JAMA Oncol. Published online May 31, 2018. doi:10.1001/jamaoncol.2018.1395. PMCID: PMC6143050.
	2. *Tan, P. S.*, Lopes, G., *Acharyya, S.*, Bilger, M. and **Haaland, B.**, 2015. Bayesian network meta-comparison of maintenance treatments for stage IIIb/IV non-small-cell lung cancer (NSCLC) patients with good performance status not progressing after first-line induction chemotherapy: results by performance status, EGFR mutation, histology and response to previous induction. *European Journal of Cancer*, *51*(16), pp.2330-2344. PMID: 26364517.
	3. **Haaland, B.**, *Tan, P. S.*, De Castro, G. and Lopes, G., 2014. Meta-analysis of first-line therapies in advanced non–small-cell lung cancer harboring EGFR-activating mutations. *Journal of thoracic oncology*, *9*(6), pp.805-811. PMCID: PMC4219539.
4. **Modeling and Experimental Design in Non-Linear Regression: A major portion of my methodological research focuses on non-parametric regression and machine learning. I am particularly concerned with large sample sizes, many predictor variables, and how data collection influences the quality of model building. A sampling of relevant publications is below.**
	1. Sung, C.L., Wang, W., Plumlee, M. and **Haaland, B.**, 2019. Multiresolution Functional ANOVA for Large-Scale, Many-Input Computer Experiments. *Journal of the American Statistical Association*, pp.1-23.
	2. **Haaland, B.** and Qian, P.Z., 2011. Accurate emulators for large-scale computer experiments. *The Annals of Statistics*, *39*(6), pp.2974-3002.
	3. Xu, X., **Haaland, B.** and Qian, P.Z., 2011. Sudoku-based space-filling designs. *Biometrika*, *98*(3), pp.711-720.
5. **Public Health: I have a particular interest in public health. Public health interventions have the potential reduce mortality and disability on a massive scale. A sampling of relevant publications is below.**
	1. *Seow, D.Y.*, **Haaland, B.** and Jafar, T.H., 2015. The association of prehypertension with meals eaten away from home in young adults in Singapore. *American journal of hypertension*, *28*(10), pp.1197-1200. PMID: 25788165.
	2. Jafar, T.H., **Haaland, B.**, Rahman, A., Razzak, J.A., Bilger, M., Naghavi, M., Mokdad, A.H. and Hyder, A.A., 2013. Non-communicable diseases and injuries in Pakistan: strategic priorities. *The Lancet*, *381*(9885), pp.2281-2290. PMID: 23684257.
	3. Rahman, F., *Bose, S.*, Linnan, M., Rahman, A., Mashreky, S., **Haaland, B**. and Finkelstein, E., 2012. Cost-effectiveness of an injury and drowning prevention program in Bangladesh. *Pediatrics*, *130*(6), pp.e1621-e1628. PMID: 23147971.

**My Bibliography:** <https://www.ncbi.nlm.nih.gov/sites/myncbi/ben.haaland.1/bibliography/55061837/public/?sort=date&direction=ascending>

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

**Ongoing Research Support**

DMS-1621722 Haaland (PI) 09/01/16-08/31/19 1.2 Cal Mos

NSF/CDS&E-MSS $49,34210% FTE

Local Approximation for Large Scale Spatial Modeling

The goal of this project is to extend the functionality of local Gaussian process modeling to larger and more complex datasets.

*Role: Principal Investigator*

1U01CK000538-01 Samore (PI)           08/01/17-07/31/20                            2.1 Cal Mos

Centers for Disease Control and Prevention             $1,950,000 17.5% FTE

Modeling and Simulation to Support Antibiotic Stewardship and Epidemiological Decision-Making in Healthcare Settings

Goals: The major goals of this project are to: 1) address gaps in knowledge about how changes in patterns of antibiotic utilization affect infection and resistance outcomes for the major categories of organisms that cause healthcare-associated infection. We will do this by fitting models to observed data, and then use real-world findings to improve the validity of forward simulation models. 2) Address different aspects of decision-making regarding the implementation of infection control interventions by delivering tools to enable epidemiologists to make rational decisions about interventions to reduce the spread of HAI in their institutions.

*Role: Collaborator*

R01 PA16-160 Leung (PI) 09/01/18 – 08/31/22 2.4 Cal Mos

NIH $250,000 20% FTE

Development of Clinical Decision Tools for Management of Diarrhea of Children in High and Low Resource Settings

Diarrheal diseases are a leading cause of morbidity and mortality in children worldwide. The management of childhood diarrhea often depend on what type of pathogen is responsible, but in many cases, testing is not affordable or feasible. We propose studies to develop clinical scores to make it easier for healthcare workers to decide how to manage children with diarrhea.

*Role: Collaborator*

10050972 Mooney(PI) 09/01/18-08/31/21 1.2 Cal Mos

Cambia $277,233 10% FTE

Program evaluation for Huntsman@Home (H@H)

Goal: The goal of this project is to assess the impact of H@H, alternative end-of-life care.

*Role: Collaborator*

P30CA042014 Ulrich(PI) 05/01/18-04/30/19 1.2 Cal Mos

NIH/NCI $147,541 10% FTE

Population Health Assessment in Cancer Center Catchment Area

Goal: The goal of this project is to characterize the patients within the Huntsman Cancer Center catchment area.*Role: Collaborator*

1K08CA234431-01 O'Neil (PI) 07/01/18 – 06/30/23 0.7 Cal. Mos

NIH/NCI $176,225 5.83% FTE

Competition, Bundle Care Payment, and Low Value Cancer Care

To goal of this project is to evaluate the association between competition and use of low-value cancer care and the modifying influence of the Oncology Care Model (OCM).

*Role: Collaborator*

IR01CE002996 Cochran (PI) 09/30/18 – 09/29/21 0.6 Cal Mos

CDC $543,323 5.0% FTE

Optimizing Pregnancy and Treatment Interventions for MOMS 2.0

Goals: This study will further develop and refine a patient navigation intervention to prevent postnatal drug use relapse, establish protocols for a multisite randomized clinical trial, and pilot test the finalized intervention and multisite protocols within two health systems with high rates of opioid use disorder among pregnant women.

*Role: Collaborator*

OPP 1198876 Leung (PI) 10/16/18 – 3/31/20 0.6 Cal Mos

Bill & Melinda Gates Foundation $732,913 5.0% FTE

The goal of this project is to use predictive analytics methods to develop a smartphone decision support tool to guide healthcare workers in their use of antimicrobials for pediatric diarrhea.

*Role: Collaborator*

1R01CA224537 Lam (PI) 01/19/18-12/31/22 0.6 Cal Mos

NIH/NCI $450,954 5.0% FTE

Affective Science and Smoking Cessation

Real Time Real World Assessment Field-based methodological approaches will be used to examine the associations of distinct emotions, cognitions, context, and self-regulatory capacity with smoking lapse to create dynamic, accurate prediction models of risk.

*Role: Collaborator*

U01CA229437 Nahum-Shani/Wetter (MPI) 09/01/18-08/30/22 0.6 Cal Mos NIH $544,027 5.0% FTE

Novel Use of mHealth Data to Identify States of Vulnerability and Receptivity to JITAIs

The goal of this project is to apply innovative computational approaches to one of the most extensive and racially/ethnically diverse collection of real time, real world data on health behavior change (smoking cessation) to inform the development of theory-driven behavioral interventions.

*Role: Collaborator*