BIOGRAPHICAL SKETCH

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NAME: Kristen L Knutson

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

POSITION TITLE: Associate 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
McGill University, Montreal, Canada	B.A.	06/92	English Literature
University at Albany, SUNY, Albany, NY	M.A.	06/99	Biomedical Anthropology
University at Albany, SUNY, Albany, NY	Ph.D.	06/04	Biomedical Anthropology
University of Chicago, Chicago, IL	Postdoctoral training	06/06	Endocrinology

A. Personal Statement

My research focuses on how sleep and circadian physiology impacts risk of chronic diseases such as cardiovascular disease, diabetes, obesity and cognitive dysfunction. A goal of my research is to identify the characteristics of sleep and circadian rhythms associated with health and disease and understand the mechanisms underlying this association. This information is critical to developing strategies and therapies to reduce disease and improve public health. Much of my research has been conducted outside the laboratory to examine associations between sleep and cardiometabolic health in the “real world”. I was the PI of an R01-funded project to collect polysomnography recordings and biomarkers of cardiometabolic disease in the Baependi Heart Study in Brazil. I am also MPI on two other observational studies that are examining habitual measures of sleep and health outcomes. These include a study of sleep disparities and cognition in older adults (R01 AG059291) and an ancillary study to the CARDIA cohort study where we are adding assessments of habitual sleep patterns and sleep disordered breathing (1R01HL152442-01). Finally, I am MPI on an experimental studies in humans that is manipulating meal timing and caloric distribution to assess the impact on cardiometabolic function and sleep, and includes assessment of multiple biomarkers as potential mediators linking dietary timing, circadian rhythms and health (P01AG011412-18A1). Future research will continue to examine sleep and circadian rhythms in humans and their role in human health.

Ongoing and recently completed projects that I would like to highlight include:

R01HL141881 (PI) 02/15/19-01/31/23
NIH/NHLBI
Leveraging a Unique existing Cohort to elucidate the Link between sleep and cardio-metabolic disease

R01 AG059291 (MPI with Carnethon) 07/01/19-3/31/24
NIH/NIA
An Epidemiologic Study of Disparities in Sleep and Cognition in Older Adults (DISCO)

1R01HL152442-01 (MPI with Carnethon) 07/15/20-6/30/24
NIH

Determinants and Cardiovascular Consequences of Disparities in Sleep and Circadian Rhythms between Black and White Adults

P01AG011412-18A1 (Zee) 09/15/17-05/31/22
NIH/NIA
Alterations of Sleep and Circadian Timing in Aging
My role: MPI of Project 2, "Behavioral Chronotype: Impact on Sleep and Metabolism"

B. Positions and Honors
Positions:

2016-present Associate Professor, Center for Sleep and Circadian Medicine, Department of Neurology, and Department of Preventive Medicine, Northwestern University Feinberg School of Medicine, Chicago IL

2009-2016 Assistant Professor, Section of Pulmonary/Critical Care, Department of Medicine, University of Chicago, Chicago, IL

2006-2009 Research Associate (Assistant Professor), Department of Health Studies, University of Chicago, Chicago, IL

2004-2006 Postdoctoral Scholar, Section of Endocrinology, Department of Medicine, University of Chicago, Chicago, IL

Honors and Awards:

2017 University of Surrey Institute of Advanced Studies Santander Fellow (competitive application)
2013-2016 National Sleep Foundation Sleep in America Poll Fellow
2006-2011 NIH Clinical Loan Repayment Program Grant.
2007 Hospes Sueños Award (in collaboration with the Spanish Sleep Society)
2006 Sleep Research Society's Trainee Merit Based Travel Award
2004 Human Biology Society Edward E. Hunt Student Prize
2004 Sleep Research Society's Trainee Merit Based Travel Award
2000 Initiatives for Women Award, University at Albany

C. Contributions to Science

1. **CARDIA Sleep Study**: I was the investigator responsible for all the wrist actigraphy and sleep questionnaire analyses for the CARDIA Sleep Study, which was an ancillary study to the large, on-going cohort study CARDIA. Our ancillary study involved only the Chicago site of CARDIA. We recorded 3 days of wrist actigraphy twice, approximately one year apart, for a total of 6 days per participant between 2003 and 2005. Wrist actigraphy is an objective estimate of habitual sleep duration and quality. As part of the main study, participants underwent a thorough clinical examination in 2000-2001 (Year 15 of CARDIA) and 2005-2006 (Year 20 of CARDIA). We examined the associations between sleep duration, sleep quality and several physiological measures. First, we found that African Americans had shorter sleep and worse sleep quality compared to whites, even after adjustment for numerous potential confounders including socioeconomic indicators. We also found that sleep duration and quality were associated with cardiovascular health measures, specifically blood pressure, coronary artery calcification and intima-media thickness. Finally, among persons with diabetes, poor sleep quality was associated with higher fasting glucose, fasting insulin and estimated insulin resistance.

1. DS. Lauderdale, **KL Knutson**, LL. Yan , PJ. Rathouz, SB. Hulley, S Sidney, K Liu. 2006. Objectively Measured Sleep Characteristics Among Early Middle-Aged Adults: The CARDIA Study. American Journal of Epidemiology 164:5-16.
2. **KL Knutson**, E Van Cauter, PJ Rathouz, LL Yan, K Liu, DS Lauderdale. 2009. Association between sleep and blood pressure in mid life: The CARDIA Sleep Study. Archives of Internal Medicine 169(11):1055-61. (PMCID: PMC2944774)
3. **KL Knutson**, E Van Cauter, PJ Rathouz, LL Yan, K Liu, DS Lauderdale. 2011. Cross-sectional associations between measures of sleep and markers of glucose metabolism among persons with and without diabetes: The CARDIA Sleep Study. Diabetes Care 34(5):1171-6. (PMCID: PMC3114508)

4. King CR, **Knutson KL**, Rathouz PJ, Sidney S, Liu K, Lauderdale DS. 2008. Short sleep duration and incident coronary artery calcification. JAMA 300(24):2859-66. (PMCID: PMC2661105)

2. **Patients with Diabetes**. I have been involved in studies focusing on sleep or circadian timing in patients with diabetes or prediabetes. First, we conducted a survey study among patients with type 2 diabetes and found that poorer subjective sleep quality was associated with higher hemoglobin A1c, which suggests worse glycemic control. More recently, we found that a later chronotype (as indicated by sleeping at a later clock time) was associated with worse glycemic control in type 2 diabetes patients. In addition, skipping breakfast was also associated with worse glycemic control, even after taking into account chronotype.

1. **KL. Knutson**, AM. Ryden, BA. Mander, E Van Cauter. 2006. Role of sleep duration and quality in the risk and severity of type 2 diabetes. Archives of Internal Medicine 166:1768-1774.
2. S Reutrakul, MM Hood, SJ Crowley, MK Morgan, M Teodori, **KL Knutson**, E Van Cauter. 2013. Chronotype Is Independently Associated With Glycemic Control in Type 2 Diabetes. Diabetes Care. 36(9):2523-9. (PMCID: PMC3747872)
3. S Reutrakul, MM Hood, SJ Crowley, MK Morgan, M Teodori, **KL Knutson**. 2014. The Relationship between Breakfast Skipping, Chronotype and Glycemic Control in Type 2 Diabetes. Chronobiology International 31(1):64-71
4. S Reutrakul, A Thakkinstian, T Anothaisintawee, S Chontong, A Borel, MM Perfect, CC Janovsky, R Kessler, B Schultes, IA Harsch, M van Dijk, D Bouhassira, B Matejko, RB Lipton, P Suwannalai, N Chirakalwasan, AK Schober, **KL Knutson**. 2016. Sleep Characteristics in Type 1 Diabetes and Associations with Glycemic Control: Systematic Review and Meta-analysis. Sleep Medicine; 23:26-45.

3. **Sociocultural and racial/ethnic differences**. I am also very interested in sociocultural and racial/ethnic differences in sleep, as well the interaction between sleep and health measures in these different populations. For example, I analyzed the Hispanic Health and Nutritional Examination Survey, which recruited three Hispanic samples: Mexican American, Cuban-American and Puerto Ricans. In this analysis, I found that short self-reported sleep duration was associated with higher body mass index in the Mexican-Americans only. I have also analyzed PSG data and found that African Americans have less slow wave sleep than whites, even after adjusting for possible confounders. I went to a region of Haiti that did not have electricity in the community to measure sleep patterns using wrist actigraphy. In these data, I found that time in bed was longer than reported for Americans (over 9 hours on average) but sleep duration was only about 7 hours on average. Furthermore, there were no gender differences or decline in sleep duration or quality with aging. Finally, in the Chicago Area Sleep Study, we observed significantly shorter habitual sleep duration among racial/ethnic minority groups compared to whites. Taken together, this work emphasizes that we need to understand patterns of sleep in different populations and examine if/how sleep is associated with health in each population.

1. **KL Knutson**. 2011. Association Between Sleep Duration and Body Size Differs Among Three Hispanic Groups. American Journal of Human Biology;23:138–141.
2. B Mokhlesi, S Pannain, F Ghods, **KL Knutson**. 2011. Predictors of slow-wave sleep in a clinic-based sample. Journal of Sleep Research; 21(2):170-5.
3. **KL. Knutson**. 2014. Characteristics of sleep and their association with aging in rural Haiti. American Journal of Human Biology 26(1):80-6. (PMCID In process)
4. MR. Carnethon, PJ De Chavez, P Zee, KY Kim, K Liu, JJ Goldberger, J Ng, **KL Knutson**. 2016. Disparities in sleep characteristics by race/ethnicity in a population-based sample: Chicago Area Sleep Study. Sleep Medicine; 18:50-5.

4. **Analysis of sleep and health in large datasets**. I have previously published analyses using data from the National Study of Adolescent Health, the National Health and Nutrition Examination Survey (NHANES), national time diary datasets and the UK Biobank. I found that sleep duration was associated with BMI in adolescent males but not females, however, there was a significant increase in sleep problems associated with pubertal development in females but not males. In NHANES data, we found that sleep duration and sleep disturbances were associated with dietary characteristics. Using time diary data, we found that the prevalence of short sleepers has increased among full-time workers, but not other employment groups. I analyzed data from a large cohort of Hispanic/Latino adults in the US and found that sleeping at a later clock time was

associated with greater insulin resistance. Finally, we found that self-identified definite evening types had a 10% increased risk of mortality over ~6.5 years of follow-up.

1. **KL Knutson**. 2011. Association Between Sleep Duration and Body Size Differs Among Three Hispanic Groups. American Journal of Human Biology;23:138–141.
2. MA Grandner, NJ Jackson, JR Gerstner, **KL Knutson**. 2013. Dietary nutrients associated with short and long sleep duration: data from a nationally representative sample. Appetite; 64:71-80.
3. **KL Knutson**, D Wu, SR Patel, JS Loredo, S Redline, J Cai, LC Gallo, Y Mossavar-Rahmani, AR Ramos, Y Teng, ML Daviglus, PC Zee. 2017. Association between sleep timing, obesity, diabetes: the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) cohort study: Sleep timing, obesity, and diabetes. *Sleep* 40(4).
4. **KL Knutson** and M von Schantz. 2018. Associations between chronotype, morbidity and mortality in the UK Biobank cohort. Chronobiology International; 35(8):1045-1053.

5. **Sleep and Circadian Rhythms in Baependi, Brazil.** I have collaborated on several papers that were based on data collected as part of the Baependi Heart Study. These include the examining of chronotype via the gold standard, dim light melatonin onset, which suggested that this population have an earlier chronotype than observed in other areas, such as the US and Europe. We also examined the heritability of chronotype and whether chronotype is associated with regional brain volumes. Finally, we collected subjective sleep data using the PSQI during the beginning of the COVID-19 pandemic to examine the impact of the pandemic on sleep quality.

1. FS. Ruiz, F Beijamini, AD Beale, B da Silva, B Gonçalves D Vartanian TP Taporoski, B Middleton, JE. Krieger, H Vallada, J Arendt, AlC. Pereira, **KL Knutson**, M Pedrazzoli, M von Schantz. 2020. Early chronotype with advanced activity rhythms and dim light melatonin onset in a rural population. J Pineal Res. 2020;69:e12675.
2. MA Leocadio-Miguel, FS. Ruiz, SS Ahmed, TP Taporoski, ARVR. Horimoto, F Beijamini, M Pedrazzoli, **KL Knutson**, AC Pereira, M von Schantz. 2021. Compared Heritability of Chronotype Instruments in a Single Population Sample. Journal of Biological Rhythms. Epub ahead of print. https://doi.org/10.1177/07487304211030420
3. S. Evans*, MA Leocadio-Miguel*, TP Taporoski, LM Gomez, ARVR Horimoto, E Alkan, F Beijamini, M Pedrazzoli, **KL Knutson**, JE Krieger, HP Vallada, A Sterr, AC Pereira, AB Negrão, M von Schantz. 2021. Evening preference correlates with regional brain volumes in the anterior occipital lobe. *Chronobiology International;* 38(8):1135-1142.
4. TP Taporoski, F Beijamini, LM Gómez, FS Ruiz, SS Ahmed, M von Schantz, AC Pereira, **KL Knutson**. 2021 Subjective sleep quality before and during the COVID-19 pandemic in a Brazilian rural population. Sleep Health, Dec 16;673. doi: 10.1016/j.sleh.2021.11.007. Online ahead of print.

Complete List of Published Work in MyBibliography:

http://www.ncbi.nlm.nih.gov/sites/myncbi/kristen.knutson.1/bibliography/43900696/public/?sort=date&direction=ascending