Big Data Approaches for Novel Mechanistic Insights on Disorders of Sleep and Circadian Rhythms

Draft Agenda for Sleep and Big Data Workshop

Day 1

Start Time	End Time	Speaker	Topic
12:00 PM	12:05 PM	Shaun Purcell, PhD, *Harvard University/Broad Institute and* Lauren Hale, PhD, *Stony Brook Medicine*	Welcome and Workshop objectives
12:05 PM	12:25 PM	Regina Bures, PhD, *NIH/NICHD*	Introduction to Big Data: Relation to NHLBI Strategic Vision
Session 1: Keynote			
12:25 PM	12:45 PM	Girish Nadkarni, MD, MPH, *Icahn/Mount Sinai School of Medicine*	Counting Sheep 2.0: Role of AI in Sleep Research
Session 2: Resources for sleep data analyses and their applications **Moderator: Sidd Shenoy, PhD, NHLBI**			
12:45 PM	1:05 PM	Carolyn Reyes-Guzman, PhD, *NCI/NIH*	Publicly available cross-sectional surveys (NHANES, AllofUs, NCI Connects American Time Use Survey (US census)
1:05 PM	1:25 PM	Shaun Purcell, PhD, Harvard University/Broad Institute	Sleep and large-scale datasets: resources, challenges & applications
1:25 PM	1:45 PM	Sweta Ladwa, MPH, *NHLBI*	NHLBI's BioData Catalyst: Driving Discovery for HLBS Researchers
1:45 PM	2:05 PM	Brian Cade, PhD, *BWH/Harvard Medical School*	Leveraging clinical biobanks to understand sleep apnea and related comorbidities
2:05 PM	2:25 PM	Brandon Westover, MD, PhD, *BIDMC/Harvard Med School*	Collection of PSGs for retrospective and prospective studies and CAISR algorithm for their analysis
2:25 PM	**2:45 PM**	**Break**	
2:45 PM	3:05 PM	Jeff Durmer, MD, PhD, *Georgia State University*	The "New Normal": remote monitoring, wearables, and current applications
3:05 PM	3:25 PM	Massimilliano de Zambotti, PhD, *SRI International*	Understanding Sleep-Tracking Technology: Assessing Sleep & Sleep Physiology - Possibilities & Limitations
3:25 PM	3:45 PM	Manisha Desai , PhD, *Stanford University*	The Role of Clinical Trials in Delivering on the Promise of AI to Advance Health
3:45 PM	3:55 PM	**Q&A for Session 2**	
Panel Discussion: Pathways/challenges to utilization of these resources for more precise analysis and diagnosis of sleep disorders (circadian, OSA, insomnia) **Moderator: Lawrence Baizer, PhD, NHLBI**			

Start Time	End Time	Speaker	Topic
3:55 PM	4:55 PM	Ankit Parek, PhD, *Icahn/Mount Sinai School of Medicine* Rosemary Braun, PhD, *Northwestern University* Bing Si, PhD, *State University of New York at Binghamton* Julio Fernandez-Mendoza, PhD, *Penn State University* Kelton Minor, PhD, *Columbia University Data Science Institute* Girish Nadkarni, MD, MDH, *Icahn/Mount Sinai School of Medicine*	**Key Questions:** 1. What new discoveries has application of AI/machine learning to sleep data permitted? What further insights might be predicted using current approaches? 2. What are the limitations of currently available AI/ML approaches and how might these be overcome? 3. How can insights gained from big data and sleep studies be applied therapeutically for sleep disorders? How much more information is needed to achieve that? What are the barriers to application? 4. What are the major clinical questions addressed by AI/machine learning? How can these analyses in sleep inform other fields (cardiovascular, renal, pulmonary) and vice versa?
4:55 PM	5:00 PM	**Day 1 Closing Remarks** **End Day 1**	

Day 2

Start Time	End Time	Speaker	Topic
12:00 PM	12:05 PM	Shaun Purcell, PhD, *Harvard University/Broad Institute* Lauren Hale, PhD, *Stony Brook Medicine*	Opening Remarks
Session 3: Examples of applications of big data approaches to characterize adverse health effects manifestations of sleep disorders **Moderator: Inna Belfer, MD, PhD, NCCIH**			
12:05 PM	12:25 PM	Diego Mazzotti, PhD, *University of Kansas Medical Center*	Dissecting the heterogeneity of obstructive sleep apnea towards understanding cardiovascular risk
12:25 PM	12:45 PM	Soomi Lee, PhD, *Penn State University*	Sleep Health Profiles, Pain, and Biological and Behavioral Mechanisms
12:45 AM	1:05 PM	Dina Katabi, PhD, *MIT*	Breathing analysis and PD (MGH study using data from NSRR)
1:05 AM	1:15 AM	**Q&A for Session 3**	
Session 4: Big data and AI analyses of sleep and circadian disorders across the lifespan and their differential effects on health **Moderator: Todd Horowitz, PhD, NCI**			
1:15 PM	1:35 PM	Orsolya Kiss, PhD, *Columbia University*	Using Explainable Machine Learning to Investigate Predictors of Adolescent Physical and Mental Health
1:35 PM	1:55 PM	Adam Spira, PhD, *Johns Hopkins University*	Adults and Aging
1:55 PM	2:15 PM	Jonna Morris, PhD, *University of Pittsburgh*	Sex differences in OSA
2:15 PM	2:25 PM	**Q&A for Session 4**	
2:25 PM	**2:45 PM**	**Break**	
Session 5: Focus on population and environmental influences, ethical issues **Moderator: Dana Schloesser, PhD, NIH/OBSSR**			
2:45 PM	3:05 PM	Azizi Seixas, PhD, *University of Miami*	Precision and Personalized Population Sleep Health: Establishing A Big Data Research Program In Urban and Rural Settings
3:05 PM	3:25 PM	Marianthi-Anna Kioumourtzoglou, PhD, *Columbia University*	Harnessing Big Environmental Data for Sleep and Circadian Rhythms Research
3:25 PM	3:45 PM	John FP Bridges, PhD, *Ohio State University*	The ethical, legal, and social implications of artificial intelligence in medicine
3:45 PM	3:55 PM	**Q&A for Session 5**	
Wrap Up			
3:55 PM	4:05 PM	Workshop Chairs	Summary and Future Directions
Workshop End			