
BIOGRAPHICAL SKETCH

NAME: Kenneth P. Wright Jr., PhD

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

POSITION TITLE: College Professor of Distinction

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
University of Arizona, Tucson Az	B.A.	05/1990	Psychology
Bowling Green State Univ. Bowling Green, OH	M.A.	05/1994	Psychology/Behavioral Neuroscience
Bowling Green State Univ. Bowling Green, OH	Ph.D.	05/1996	Psychology/Behavioral Neuroscience
Bowling Green State Univ. Bowling Green, OH	Postdoc	07/1997	Sleep and Circadian Rhythms
Harvard Medical School, Boston, MA	Postdoc	07/2000	Sleep and Circadian Medicine

A. Personal Statement

I have over 25 years of experience in the sleep and circadian fields, have led individual and multicenter/team research grants, participated in multicenter clinical trials, and participated on five T32s (including one on the executive committee and one as PI/PD). My research program is primarily aimed at understanding the physiology of sleep and circadian rhythms in humans and the health and safety consequences of sleep and circadian disruption—such as, metabolic dysregulation and impaired cognitive function. My research also explores strategies to promote sleep, enhance alertness and maintain health and safety when sleep and circadian rhythms are challenged, as well as treatment strategies for patients with circadian rhythm disorders (e.g., DSWPD, Shift Work Disorder, Jet Lag Disorder).

Since completion of construction of my independent laboratory in 2004, 22 students have completed Master degrees, eight have completed PhD degrees, seven have conducted postdoctoral fellowships, seven MD's have conducted Sleep Fellow Rotations, and more than 250 undergraduates have conducted year-plus research traineeships in my lab. Currently, I mentor one Masters and two PhD students, and I am primary/co-primary mentor of five early career investigators all supported by NIH K-awards. Many of my former trainees have stayed in research and several direct their own active research laboratories. I am committed to training the next generation of scientific leaders. My graduate and postdoctoral trainees have received numerous awards for their research activities (e.g., young investigator awards from the Sleep Research Society or American Academy of Sleep Medicine; numerous Research Excellence Awards), over 70 of my undergraduate trainees have received undergraduate research awards in support of their activities in my laboratory. I also serve as a Co-I/mentor on an institutional award from the Arnold & Mabel Beckman Foundation "2017 Beckman Scholars grant (2017-2020)" in support of undergraduate research at CU. Many of my undergraduate research assistants have gone onto graduate school, medical school, and other professional programs. My commitment to mentoring is also evident by involvement in trainee activities for professional societies. For example, I have served as Co-Chair of the Trainee Committee for the World Federation of Sleep Research and Sleep Medicine Societies. I initiated and served as chair of "trainee day" at the Society for Research on Biological Rhythms—a day devoted to trainee career development. I have contributed to the trainee professional development day of the Sleep Research Society >10 different years, and have contributed to trainee day at the European Society for Biological Rhythms Research, was editor of the Sleep Research Society Trainee Manual in Sleep Research, and served as a faculty mentor for the American Academy of Sleep Medicine/NIH Young Investigator Research Forum where I lectured on being a mentor.

B. Positions & Honors

Select Positions and Professional Activities

1989 - 1991	Res. Assist. Sleep and Cognition Unit, Psychology Dept, Univ of Arizona, Tucson, Az
1990 - 1991	Res. Assist. Psychoneurophysiology Lab, Psychology Dept, Univ of Arizona, Tucson, AZ
2000 - 2002	Instructor in Medicine, Endocrinology & Sleep Medicine Divisions, Harvard Medical School
2000 - 2002	Associate Neuroscientist, Circadian, Neuroendocrine and Sleep Disorders Section, Div of Endocrinology, and Division of Sleep Medicine Brigham and Women's Hospital, Boston, MA
2001 - 2002	Dir Fatigue Countermeasures Prog, Div Sleep Med, Brigham Women's Hosp, Boston, MA
2002 - 2009	Assistant Professor, Dept of Integrative Physiology, Univ. of Colorado, Boulder, CO
2002 -	Director, Sleep & Chronobiology Lab, Dept Integrative Physiology, Univ. of Colorado
2002 -	Member Center for Neuroscience, University of Colorado Boulder, CO
2005 -	Co-Chair, Institutional Review Board (IRB)-Biomedical Panel, Univ. of Colorado Boulder, CO
2009 - 2015	Adjunct Assoc. Prof, Div Endocrin, Metab. Diab. CU-Anschutz Medical Campus, Aurora, CO
2009 - 2015	Associate Professor, Department of Integrative Physiology, Univ of Colorado Boulder, CO
2015 -	Professor Adjunct, Div Endocrin, Metab. Diab. CU-Anschutz Medical Campus, Aurora, CO
2015 - 2019	Professor, Department of Integrative Physiology, Univ of Colorado Boulder, CO
2019 -	College Professor of Distinction, Dept of Integrative Physiology, Univ of Colorado Boulder, CO
1995-06,10	Grant Reviewer, Australian Research Council (ARC) 95, 96, 97, 99, 00, 04, 06, 10
1998 - 2000	Association for Professional Sleep Societies Trainee Program Organizing Committee
1999 - 2002	Editor; Trainee Manual in Sleep Research; APSS http://www.hms.harvard.edu/sleep/tmanual
2001	Grant Reviewer, National Institute of Health (NIH) SBIR Study Section, NIH IFCN 8-10
2001	Grant Reviewer, Special Emphasis Panel, NIH/NIOSH
2003 - 2004	Society for Research on Biological Rhythms ad hoc Trainee Program Organizing Committee
2004 - 2007	Editor, Sleep Research Society Bulletin; Vice Chair Publications Committee.
2006 - 2007	Grant Reviewer, Air Force Office for Scientific Review (AFOSR)
2006, 11,12	Grant Reviewer, United Kingdom Medical Research Council (MRC)
2006 - 2008	Trainee Organizing Committee Chair – Society for Research on Biological Rhythms
2006 - 2007	Scientific Committee & Co-Chair Trainee Comm– World Fed Sleep Res and Sleep Med Soc
2006 - 2007	Member: "Therapy of Circadian Sleep Disorders Task Force" American Academy Sleep Med
2006 - 2007	Grant Reviewer, Temporary Member, National Institute of Health (NIH) PRDP study section.
2006,07,09-11	Grant Reviewer, Temporary Member, National Institute of Health (NIH) MESH Study Section.
2007, 2010	Grant Reviewer, J. Christian Gillin, M.D., Research Grant Program, Sleep Research Society
2007 - 2009	Circadian Rhythms Section Head – Sleep Research Society
2007 - 2009	Member, Sleep Research Society, Committee on Committees
2007 -	Editorial Board, SLEEP (2013- Associate Editor)
2007 - 2008	Member, Sleep Research Society Presidential Task Force on Research Funding
2008, 11	Grant Reviewer, The Royal Society of New Zealand
2008 - 2016	Member Program Committee, Associated Professional Sleep Societies (Chair 2014-2016)
2008 - 2009	Guest Editor Sleep Medicine Clinics: Basics of Circadian Bio & Circadian Rhythm Sleep Dis.
2009, 12	Grant Reviewer, Technology Foundation of The Netherlands
2009	Grant Reviewer, Australian Antarctic Division
2009	Participant Aircraft Noise Impacts Research Roadmap Workshop, FAA
2010	Grant Reviewer, Canadian Institutes of Health Research
2010	Grant Reviewer, National Science Foundation
2010, 17	Grant Reviewer, United Kingdom Biotechnology and Biological Sciences Research Council
2010	Workgroup Member, Lighting the International Space Station (ISS) NASA
2011, 12	Grant Reviewer, Temporary Member, NIH ZRG1 BBBP-L Sleep and Social Environment
2011 - 2013	Member: "Circadian Rhythm Disorders" International Classification of Sleep Disorders Revision 3 (ICSD-3) Workgroup. American Academy of Sleep Medicine
2012	Grant Reviewer, Swiss National Science Foundation
2012	Chair, NIH Special Emphasis Panel/Scientific Review Group ZRG1 BBBP-L
2012	Grant Reviewer, Temporary Member, NIH EMNR study section
2013, 18, 19	Grant Reviewer, National Science Centre, Poland
2013, 14, 16, 17	Grant Reviewer, Fund for Scientific Research, la Fédération Wallonie-Bruxelles, Belgium
2013	Grant Reviewer, NIH/NIA Special Emphasis Panel: Circadian Clocks and Aging ZAG1 ZIJ-5
2014 -	Editorial Board, Journal of Biological Rhythms

2014 Grant Reviewer, Biomedicine & F.I.R.S.T. Program Israel Science Foundation
 2014 Grant Reviewer, Temporary Member, NIH ZRG1 IFCN-C
 2015 - 2018 Member, Sleep Disorders Research Advisory Board (SDRAB) of the NIH/NHLBI
 2015 Invited participant NIDDK Workshop-Impacts of Sleep and Circadian Disruption on Energy Balance and Diabetes
 2016 Grant Reviewer, NIH Special Emphasis Panel/Scientific Review Group ZRG1 BCMB-A
 2016 - Editorial Board, Neurobiology of Sleep and Circadian Rhythms
 2016 - 2020 Board of Directors, Sleep Research Society
 2017 Grant Reviewer, The Royal Society, United Kingdom
 2018, 20 Grant Reviewer, Temporary Member, NIH CIDO study section (Feb, Oct 2018; Oct 2020)
 2019 Grant Reviewer, Diabetes Fonds, The Netherlands
 2019 Grant Reviewer, Wellcome Trust, United Kingdom
 2019 Grant Reviewer, The Indo-U.S. Science and Technology Forum, India
 2019 Grant Reviewer, NIH Special Emphasis Panel/Scientific Review Group ZRG1 BBBP-J 52
 2020 Chair, NIH Special Emphasis Panel/Scientific Review Group ZHL1 CSR-Z (M2) 1

Honors

1991 National Science Foundation Graduate Research Fellowship - Honorable mention
 1992 -97,99 Sleep Research Society/Am Sleep Disorders Assoc. Travel Fellowship for Res Excellence
 1993 Sigma Xi Graduate Student Excellence in Res Competition Award (Second Place) BGSU
 1996 Charles E. Shanklin Award for Research Excellence of the Bowling Green State University
 1997 - 1999 National Institutes of Health National Research Service Award
 1998 - 2000 Distinction in Teaching; Derek Bok Center for Teaching and Learning, Harvard University
 1999 - 2001 Fellowship Clinical & Community Health Res., Med Found Harold Whitworth Pierce Trust
 2000 Young Investigator Award of American Academy of Sleep Medicine – Honorable mention
 2002 Science—Physiology News Focus Article July 2002
 2002 American Journal of Physiology, Reg. Integr. Comp. Physiol.—Top Ten Most Frequently Read Articles August 2002 and Editorial Focus Article December 2002
 2003 Young Investigator, William C. Dement Sleep & Chronobiology Apprenticeship-Brown Univ
 2005 J. Christian Gillin, M.D. Research Award, Sleep Research Society Foundation
 2007 Marius Smith Award, University of Colorado Parents Association
 2007 Distinguished Service Award, Sleep Research Society
 2011 Journal of Physiology - Top Three Most Frequently Read Articles
 2013, 17, 19 Current Biology - Most Frequently Read Articles
 2013 Provost's Faculty Achievement Award
 2015 Science—Insights/Perspective Article September 2015
 2016 Top 1% of Clinical Medicine (2 papers), Top 1% of Neuroscience and Behavior (1 paper)
 Essential Science Indicators Highly cited papers as of Nov/Dec 2015
 2018 Boulder Faculty Assembly Excellence in Research, Scholarly and Creative Work
 2019 Integrative Physiology Faculty Excellence in Research – University of Colorado Boulder
 2019 College Professor of Distinction—University of Colorado Boulder

C. Contributions to Science

My research has contributed to our understanding of the physiology of sleep and circadian rhythms in humans, explaining the health and safety consequences of sleep loss and circadian misalignment—such as cardiometabolic dysregulation and impaired cognition—and applying that knowledge to improve public health and safety. My research also aims to test countermeasure and treatment strategies to promote optimal sleep, wakefulness, and health in a variety of circumstances in which sleep deprivation and circadian misalignment occur (e.g., circadian rhythm sleep-wake disorders, insufficient sleep, insomnia). This research effort has resulted in over 130 peer-reviewed publications. The citations provided for each contribution have been selected to demonstrate my *sustained impact* on the field as well as *new contributions*. My PubMed publication list can be viewed at <http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/41150600/?sort=date&direction=ascending>

Metabolic Consequences of Sleep Loss and Circadian Misalignment. Insufficient sleep is an independent risk factor for obesity and diabetes, yet the physiological and behavioral mechanisms underlying this risk are largely unknown. As PI, I developed a transdisciplinary component of my research program that combines my expertise with that of colleagues in obesity, diabetes, cardiovascular and omics research. Our overall aims are to improve understanding of how sleep and the circadian clock influence metabolism and vascular health, and to determine

how sleep and circadian disruption contribute to cardiometabolic disorders such as obesity, diabetes and heart disease. Our findings demonstrate insufficient sleep increased 24-hour energy expenditure and that during insufficient sleep schedules, food intake increased, especially at night. Eating at night is reported in the epidemiological literature to be a risk factor for weight gain, and our results provide experimental evidence in support of such findings. Thus, increased food intake during insufficient sleep schedules appears to be a physiological adaptation to provide the body with the energy needed to be awake longer. However, in the modern obesogenic environment of readily accessible food, weight gain occurs because food intake is more than necessary to offset the energy demands of sleep loss. We further demonstrated that weekend recovery sleep is not an effective strategy to maintain metabolic health. We have also examined how circadian misalignment, such as is common in shift work, contributes to weight gain and changes in the human proteome that may mechanistically contribute to cardiometabolic dysregulation.

- a. Markwald RR, Melanson EL, Smith MR, Higgins J, Perreault L, Eckel RH, Wright KP Jr. Impact of insufficient sleep on total daily energy expenditure, food intake and weight gain. *Proc. Natl. Acad. Sci. USA.* 2013. 110(14):5695-700. PMID 23479616.
- b. McHill AW, Melanson EL, Higgins J, Connick E, Moehlan TM, Stothard ER, Wright KP Jr. Impact of Circadian Misalignment on Energy Metabolism During Simulated Nightshift Work. *Proc. Natl. Acad. Sci. USA.* 2014; 111:17302-7. PMID: 25404342.
- c. Depner CM, Melanson EL, McHill AW, Wright KP Jr. Mistimed food intake and sleep alters 24 hour time-of-day patterns of the human plasma proteome. *Proc. Natl. Acad. Sci. USA.* 2018;115:E5390-E5399.
- d. Depner CM, Melanson EL, Eckel RH, Snell-Bergeon JK, Perreault L, Bergman BC, Higgins JA, Guerin MK, Stothard ER, Morton SJ, Wright KP Jr. Ad libitum Weekend Recovery Sleep Fails to Prevent Metabolic Dysregulation during a Repeating Pattern of Insufficient Sleep and Weekend Recovery Sleep. *Curr Biol.* 2019; 29(6):957-967.e4. PMID: 30827911

Entrainment and Phase Shifting the Human Circadian Clock. The internal clock coordinates much of our physiology and behavior including when we eat, when we perform at our best, and when we sleep. Effective resetting of the internal circadian clock is necessary for adaptation to jet lag, for treatment of circadian rhythm disorders, and for maintaining optimal sleep and circadian timing relative to work and school demands. Later bedtimes are associated with morning sleepiness, greater difficulties at work and school, and increased risk for some health problems such as mood disorders and obesity. I have conducted a series of studies designed to understand basic principles of human circadian physiology and contributing factors to late sleep timing (e.g., circadian period, phase resetting with light, entrainment to modern light exposure patterns versus the natural light-dark cycle) and developing treatment strategies circadian rhythm disorders and late sleep timing.

- a. Wright KP Jr., Czeisler CA. Absence of Circadian Phase Resetting in Response to Bright Light Behind the Knees. *Science.* 2002; 297:571. PMID: 12142528.
- b. Wright KP Jr., McHill AW, Birks BR, Griffin BR, Rusterholz T, Chinoy ED. Entrainment of the human circadian clock to the natural light-dark cycle. *Curr. Biol.* 2013;23:1554-8. PMID: 23910656
- c. Burke TM, Markwald RR, McHill AW, Chinoy ED, Snider JA, Bessman SC, Jung CM, O'Neill JO*, Wright KP Jr.* Effects of caffeine on the human circadian clock in vivo and in vitro. *Science Transl. Med.* 2015. 7(305):305ra146. *co-corresponding authors. PMID: 26378246
- d. Stothard ER, McHill AW, Depner CM, Birks BR, Moehlan TM, Ritchie HK, Guzzetti JR, Chinoy ED, LeBourgeois MK, Axelsson J, Wright KP Jr. Circadian Entrainment to the Natural Light-Dark Cycle Across Seasons and the Weekend. *Curr. Biol.* 2017; 27; 1-6. PMID: 28162893.

Cognitive Consequences of Sleep Loss and Circadian Misalignment, and Countermeasure Assessment. My research to understand the influence of sleep loss and circadian misalignment on cognitive function and to assess the efficacy, effectiveness and safety of countermeasures to promote sleep and wakefulness has resulted in the following key findings: a) cognitive impairments associated with awakening from sleep are more severe than those in response to total sleep deprivation. This finding has important implications for individuals such as physicians, fire fighters, paramedics, security and military personnel whom are all required to perform immediately upon awakening from sleep; b) sleep inertia, time awake and circadian phase interact to modulate cognition; c) melatonin agonists improve daytime sleep, including in patients with jet lag disorder; d) modafinil improve wakefulness at night, including in patients with shift work disorder; e) sleep medication use during space flight is high in astronauts, yet does not result in sufficient sleep, thus more effective countermeasures are needed; f) caffeine improves performance at night but disturbs subsequent daytime sleep with implications for shift workers; g) the most commonly used sleep medication worldwide—zolpidem—improves sleep but impairs walking stability in older adults and cognition (especially in younger adults).

- a. Czeisler CA, Walsh JK, Roth T, Hughes RJ, Wright KP Jr. Kingbury L, Arora S, Schwartz JRL, Niebler GE, Dinges DF. Modafinil for Excessive Sleepiness Associated With Shift Work Sleep Disorder. **New Engl. J. Med.** 2005; 353:476-486. PMID: 16079371
- b. Wertz AT, Ronda JM, Czeisler, CA, Wright KP Jr. The Influence of Sleep Inertia on Cognition. **JAMA**, 2006; 295:163-164. PMID: 16403927
- c. Landrigan CP, Rahman SA, Sullivan JP,Wright KP Jr.,... .. Zee PC, Lockley SW, Stone KL, Czeisler CA; ROSTERS Study Group. Effect on Patient Safety of a Resident Physician Schedule without 24-Hour Shifts. **New Engl. J. Med.** 2020 Jun 25;382(26):2514-2523. PMID: 32579812
- d. Wright KP Jr., Linton SK, Withrow D, Casiraghi L, Lanza SM, Iglesia H, Vetter C, Depner CM. Sleep in university students prior to and during COVID-19 Stay-at-Home orders. **Curr Biol.** 2020 30(14):R797-R798. PMID: 32693068