

**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: Cash, Elizabeth Danielle

eRA COMMONS USER NAME (credential, e.g., agency login): edlush01

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
University of Louisville, Louisville, KY	B.A.	05/2006	Psychology, Natural Sciences Concentration
University of Louisville, Louisville, KY	M.S.	12/2008	Experimental Psychology, Biobehavioral Oncology Concentration
University of Florida, Gainesville, FL	Internship	06/2012	Clinical Medical/Health Psychology
University of Louisville, Louisville, KY	Ph.D.	12/2012	Clinical Psychology, Health Psychology Concentration
University of Louisville School of Medicine, Louisville, KY	Postdoc	01/2014	Clinical Health Psychology
Harvard Medical School, Boston, MA	Postgrad. Certificate	10/2019	High-Impact Cancer Research: Cancer Biology & Therapeutics

**A. Personal Statement**

My translational research is firmly concentrated on understanding the mechanisms of circadian disruption and related processes in cancer. I have extensively examined circadian rest/activity (actigraphy) and endocrine (cortisol) disruption in the context of cancer. I have consulted and trained with established actigraphy researchers to grow my expertise in the analysis and interpretation of ambulatory circadian monitoring using actigraphy. I have experience applying parametric and non-parametric analytic techniques to ambulatory data, and I have a working knowledge of large scale ("big data") analytic techniques for time series data. I have experience using signal processing techniques to aggregate multiple simultaneous recordings of host circadian systems. I have also trained and mentored students in the appropriate scoring, analysis and interpretation of chronobiologic data. I bring this decade of knowledge to bear as I have begun to establish my research program designed to elucidate mechanisms of circadian disruption in patients with head and neck squamous cell carcinoma (HNSCC). Little is known about circadian processes in these patients, who often present with aggressive and treatment-refractory cancers. My initial work in this population revealed biological pathways by which depression adversely affects adequate HNSCC control and survival (a). This study was acknowledged as particularly meritorious by editorial staff of the journal, *Cancer*, in which it was published. The resultant press release was picked up by more than 50 regional, national and international news outlets. I extended this science with new data that advanced our understanding, offering clear evidence that circadian disruption contributes to head and neck cancer treatment outcomes (b). I also completed a certificate course on cancer biology and therapeutics offered at Harvard Medical School. Here I expanded my understanding of the molecular mechanisms of circadian rhythms and how the co-opting of circadian signals appears to be functionally important for the growth and development of tumors. My work from this course culminated in a systematic review of the literature highlighting links between circadian cellular machinery and tumor hallmark acquisition, which was published in a high-impact journal (c). Because of my work in this area, I was invited to give a podium presentation at a national conference relaying the science linking depressive symptoms and cancer outcomes (d). I also consult widely with many different healthcare professionals, have experience with

data curation for early phase clinical trials, and have conducted statistical analyses for a wide variety of social and medical research projects.

- a. Zimmaro L, Sephton S, Siwik C, Phillips K, Rebholz W, Kraemer H, Giese-Davis J, Wilson L, Bumpous J, **Cash E** (2018). Depressive Symptoms Predict Head and Neck Cancer Survival: Examining Plausible Behavioral and Biological Pathways. *Cancer*, 124(5), 1053-1060. PMID: PMC5821545
- b. **Cash E**, Duck C, Brinkman C, Rebholz W, Albert C, Worthen M, Jusufbegovic M, Wilson L, Bumpous J (2018). Depressive Symptoms and Actigraphy-Measured Circadian Disruption Predict Head and Neck Cancer Survival. *Psychooncology*, 27(10), 2500-2507. PMID: 30117225
- c. **Cash E.**, Sephton S., Woolley C., Elbehi A.M., R. I. A., Ekine-Afolabi B., Kok V.C. (2021). The role of the circadian clock in cancer hallmark acquisition and immune-based cancer therapeutics. *Journal of Experimental and Clinical Cancer Research*. Apr 1;40(1):119. PMID: 33794967
- d. **Cash, E.** Addressing the Psychological Aspects of Head and Neck Cancer (2022). ASTRO Multidisciplinary Head and Neck Cancers Symposium. Feb 24, Phoenix, AZ.
  - o *Honorarium and travel award*
  - o *Featured on The ASCO Post, <https://bit.ly/38308eX>*

## **B. Positions, Scientific Appointments, and Honors**

### **Positions and Employment**

2020-Current	Associate Professor with Tenure, Director of Research, Department of Otolaryngology-Head & Neck Surgery & Communicative Disorders, Univ of Louisville School of Medicine
2014-2020	Assistant Professor, Director of Research, Department of Otolaryngology-Head & Neck Surgery & Communicative Disorders, Univ of Louisville School of Medicine
2014-Current	Licensed Clinical Psychologist, Kentucky, License Number 128221
2013-Current	Clinical Health Psychologist, Univ of Louisville Physicians, Otolaryngology-H&N Surgery
2013-Current	Adjunct Assistant Professor, Dept of Psychological & Brain Sciences, Univ of Louisville
2013-2018	Adjunct Assistant Professor, Dept of Family & Geriatric Medicine, UL School of Medicine
2012-2013	Research Coordinator & Postdoctoral Associate: Division of Otolaryngology-Head & Neck Surgery; Head & Neck Cancer Multidisciplinary Clinic; UL Pediatrics Primary Care Clinic
2011-2012	Clinical Health Psychology Chief Intern, Univ. of Florida APA-Approved Internship
2006-2011	Research & Teaching Assistant, Dept of Psychological & Brain Sciences, Univ of Louisville

### **Other Experience and Professional Memberships**

2022	Ad Hoc Reviewer, Institute for Clinical and Translational Science and Susan Samuel Integrative Health Institute pilot grant, UC Irvine
2022-Current	Member, Univ of Louisville School of Medicine Research Committee
2022-Current	Member, JG Brown Cancer Center Clinical Scientific Review Committee, Univ of Louisville
2021-Current	Editorial Board Member, <i>Annals of Behavioral Medicine</i>
2021-Current	Member, University-Wide Faculty Grievance Committee, Univ of Louisville
2018-2019	Harvard Medical School Cancer Biology & Therapeutics: High-Impact Cancer Research, selected by committee through competitive application process for a blended learning certificate program designed to advance cancer research
2017	Member, Third International Conference on Internet & Audiology Programming Committee
2017	AAMC Women in Medicine Early Career Leadership Conference attendance award, selected by national committee through competitive nomination and application process
2017	Univ of Louisville School of Medicine Leadership and Innovation in Academic Medicine, selected by committee through competitive process with 29% acceptance rate for year-long professional development course. Only attendee invited to present one of the 12 workshops.
2016-2020	Associate Editor, <i>Journal of Clinical Psychology in Medical Settings</i>
2014-Current	Scientific Fellow, American Academy of Otolaryngology-Head and Neck Surgery
2014-Current	Chair, Louisville Chapter Programming, AAMC Group on Women in Medicine and Science,
2013	Grant Reviewer, The Icelandic Research Fund, Division for Science and Innovation
2013-Current	Member, Amer Psychol Assn D12, S8: Psychologists in Academic Health Centers (APAHC)
2015	Member, National Conference Planning Committee & Poster Subcommittee

2015 – 2020 Member, Research Committee  
2017 – 2019 Chair, National Conference Sponsorship Subcommittee  
2018 – 2021 Secretary, APAHC Board  
2019 – 2021 Co-Chair, Biennial National Conference  
2022 – 2023 President Elect, APAHC Board  
2012-Current Member, Kentucky Psychological Association  
2014-2015 Chair, Early Career Psychologists Committee  
2010-Current Member, American Psychosomatic Society  
2013, 2010 Annual Meeting Abstract Reviewer

### Honors

2022 Elected as President, Association of Psychologists in Academic Health Centers, Section 8 of Division 12 of the American Psychological Association  
2022 Honorarium and travel award, ASTRO Multidisciplinary Head and Neck Cancers Symposium  
2017 Early Career Women in Medicine and Science Leadership Conference Attendance Award, AAMC  
2012 Dean's Graduate Citation Award, Univ of Louisville  
2011 American Psychosomatic Society Young Scholar Travel Award, partially supported by NIH  
2010 Dr. M. Celeste Nichols Award for Research on Women, Univ of Louisville  
2008 SBM 3<sup>rd</sup> Annual Cancer SIG Outstanding Student Abstract Award, Society for Behavioral Medicine  
2006 Amber M. Heuerman Research Fund, Univ of Louisville  
2005 VP for Research Undergraduate Research Scholar Grant, Univ of Louisville

### **C. Contributions to Science**

1. **Clinical Trial and Education Intervention Collaborations.** I have established multidisciplinary collaborations with faculty across departments and campuses, from Medicine, Pharmacology/Toxicology, Surgery, Oncology, Pediatrics, Oral Immunology, Psychology, Engineering, and Public Health. My position affords me opportunities to collaborate on a variety of research initiatives. I consult widely with many different healthcare professionals on a variety of projects. I have held the primary responsibility for overseeing interview and survey data collection on a variety of social and medical research projects, including clinical trials. Currently I serve as key personnel on a funded project (DOD MCDC2006-010) whose study team includes members of this proposal. On this trial, I oversaw the design of acceptability questionnaires assessing product formulation acceptability, feasibility, tolerability, and impressions about product cost. I performed the reliability tests to ensure our resultant survey was robust and publishable. I also provided oversight to a team of study personnel to ensure accurate and robust database management of clinical trial study data in preparation for statistical analysis. I have extensive experience designing, testing, and validating newly developed surveys. My training background in Clinical Psychology included robust coursework in psychometric design, validation, and reliability testing. I serve as statistician for our Medical School's eQuality initiative, a comprehensive curriculum designed to teach excellent care of LGBT, gender non-conforming, and differences of sex development individuals, where I have conducted a wide range of statistical analyses, including designing stratified randomization schemes, psychometric survey reliability and factor analysis, test item response analysis, and educational intervention outcomes analysis.
  - a. **Cash, E.;** Potts, K.; Nabeta, H.; Zahin, M.; Bushau-Sprinkle, A.; Bezold, M.; Corman, J.; Deitz, K.; Fuqua, J.; Rai, S.; Akca, L.; Siegwald, A.; Sheppard, R.; Cunningham, C.; Dryden, G.; Palmer, K. (2021) A pilot study to evaluate pharmacodynamics and tolerability profile of intranasal sampling in support of a Phase 1a topical Q-GRFT spray for broad-spectrum coronavirus pre-exposure prophylaxis. Poster presentation at Research!Louisville, Oct 26, Louisville, KY.
  - b. Sawning, S.; Holthouser, A.; Steinbock, S.; Weingartner, L.; Martin, J.; Leslie, K.; Jones, V.; Noonan, E.J.; **Cash, E.;** Shaw, M. (2017) Outcomes of eQuality: an Integrated, Comprehensive Undergraduate Education Program for LGBT-Health Training. AAMC Annual Meeting - Learn Serve Lead, Nov 3-7, Boston, MA.
  - c. Weingartner, L.; Holthouser, A.; Potter, J.; Noonan, E.; Steinbock, S.; Bohnert, C.; Shaw, M. A.; **Cash, E.;** Sawning, S. (2019) eQuality at the University of Louisville: Developing LGBTQ Health Clinical Skills Via Direct Practice. Snapshot Oral Presentation (Innovation), Annual Meeting of the Association of Standardized Patient Educators, Jun 8-11, Orlando, FL.

- d. Bohnert, C.; Brady, C.; Bush, B.; **Cash, E.**; Combs, R.; Compton, D.; Decker, H.; Holthouser, A.; Jones, F.; Kingery, S.; Latta, G.; Martin, L.; Neff, A.; Noonan, E.; Sawning, S.; Shaw, A.; Stephens, J.; Weathers, A.; Weingartner, L. (2020) eQuality: Resources from Five Years of an Integrated LGBTQ Health Curriculum. Learn Serve Lead 2020: the AAMC Annual Meeting, Nov 13-17, virtual.

2. **Psychological and Physiological Stress Indicators in Cancer.** Early in my training I became interested in understanding how complex interactions between psychological stress, circadian functioning, and tumor-associated biological processes may perpetuate cancer progression and spread. I have served as principal investigator or project director on research examining psychosocial factors and circadian disruption in patients with breast, lung, and most recently head and neck cancer. My work on these projects has included extensive application of circadian rest/activity (actigraphy) and endocrine (salivary cortisol) measurement. I have begun to carefully study the variety of summary measures that can be derived from these rich chronometric monitors which, when combined with salivary cortisol measures, help distinguish endogenous circadian signaling from environmental and behavioral cues to more fully characterize circadian disruption among patients with cancer.

- a. Eismann E, **Cash** (née Lush) E, Sephton S (2010). Circadian effects in cancer-relevant psychoneuroendocrine and immune pathways. *Psychoneuroendocrinology*, 35(7), 963-976. PMID: 20097011
- b. Sephton S, **Cash** (née Lush) E, Dedert E, Floyd A, Rebholz W, Dhabhar F, Salmon P (2013). Diurnal cortisol rhythm as a predictor of lung cancer survival. *Brain, Behavior, and Immunity*, 30, S163-S170. PMID: 22884416
- c. **Cash E**, Sephton S, Chagpar A, Spiegel D, Rebholz W, Zimmaro L, ... Dhabhar F (2015). Circadian disruption and biomarkers of tumor progression in breast cancer patients awaiting surgery. *Brain, Behavior, and Immunity*, 48, 102-114. PMID: 25728235
- d. Siwik, C; **Cash, E.**; Sephton, S.E. (2022). Depressive Symptoms and Shorter Survival in Lung Cancer: The Role of Leukocyte Telomere Length. *Psychology & Health*. Epub ahead of print. PMID: 35240880

3. **Expertise in Head and Neck Cancer.** I serve as the Chief of Service for our department's Health Psychology/Head & Neck Cancer Training Program, where postdoctoral fellows, graduate and undergraduate students, and medical residents learn to apply their research and clinical skills with patients seen at our Multidisciplinary Head and Neck Cancer Treatment Center. My position affords me opportunities to work closely with patients seeking care from Otolaryngology and Oncology physicians. This aspect of my work offers a deep understanding of the challenges these patients face, not only medically, but psychologically, socially, and behaviorally. These experiences have allowed me to target psychological assessments to address innovative research questions. My research in this area directly informs my clinical work focused on effecting health behavior change in patients with cancer. Together, these activities allow me ample opportunity to effectively implement and apply a strong empirical foundation to my clinical work. As such, I have given several invited talks on managing the stress and anxiety associated with head and neck cancers (c and d).

- a. Cao A, Khayat S, **Cash E**, Nickel C, Gettelfinger J, Tennant P, Bumpous J (2018). ACS NSQIP Risk Calculator Reliability in Head and Neck Oncology: The Effect of Prior Chemoradiation on NSQIP Risk Estimates Following Laryngectomy. *American Journal of Otolaryngology - Head and Neck Medicine and Surgery*, 39(2), 192-196. PMID: 29174070
- b. Amsbaugh, M.; Yusuf, M.; **Cash, E.**; Silverman, C.; Potts, K.; Dunlap, N. (2018) The Effect of Time to Simulation and Treatment for Patients with Oropharyngeal Cancer Receiving Definitive Radiotherapy in the Era of Risk Stratification Using Smoking and Human Papilloma Virus Status. *Head and Neck*, 40, 687-695. PMID: 29356189
- c. **Cash, E.**, (2022) How to Talk about HPV and HPV-Associated Cancer with your Family and Friends (two panels), Head and Neck Cancer Alliance webinar series, with HPV Alliance, May 12, Virtual.
- d. **Cash, E.** (Moderator); Cassidy, S.; Jackson, G.; Murphy, M; Mason, K. (2022). Managing Stress and Anxiety. Head and Neck Cancer Survivorship Symposium, Aug 18, Virtual.

4. **Mindfulness-Based Stress Reduction.** My graduate work focused on building a greater understanding of psychological effects on biology. I served as project manager for a study among women diagnosed with fibromyalgia enrolled into a randomized-controlled trial of MBSR. This study also assessed diurnal salivary cortisol expression as an indicator of circadian endocrine rhythm disruption. I have also served as consultant on more recent examinations of mindfulness behaviors. I have completed clinical training in mindfulness-based approaches to psychotherapy and administration of the MBSR intervention. Contribution to Science: My work originated with an in-depth review and analysis of the physical components taught in the MBSR program. We published observations of reduced galvanic skin conductance among fibromyalgia patients enrolled in our MBSR program. This work culminated in the publication of our randomized-controlled trial, which improved stress, sleep, and fibromyalgia symptom severity ratings, with gains maintained at two-months follow-up. Combined with my clinical training in cognitive-behavioral therapy, I have extensive experiencing studying the impact of psychological interventions on physiological stress markers.
- a. **Cash** (née Lush), **E.**, Salmon, P., Floyd, A., Studts, J.L., Weissbecker, I. & Sephton, S.E. (2009). Mindfulness meditation for symptom reduction in fibromyalgia: psychophysiological correlates. *Journal of Clinical Psychology in Medical Settings*, 16(2), 200-207. PMID: 19277851
  - b. Salmon, P., **Lush, E.**, Jablonski, M., & Sephton, S. E. (2009). Yoga and mindfulness: Clinical aspects of an ancient mind/body practice. *Cognitive and Behavioral Practice*, 16(1), 59-72.
  - c. **Cash, E.**, Salmon, P., Weissbecker, I., Rebholz, W. N., Bayley-Veloso, R., Zimmaro, L. A., ... & Sephton, S. E. (2014). Mindfulness meditation alleviates fibromyalgia symptoms in women: Results of a randomized clinical trial. *Annals of Behavioral Medicine*, 49(3), 319-330. PMID: 25425224
  - d. Zimmaro, L., Phillips, K., Salmon, P., Giese-Davis, J., Patel, H., Rowe, J., Rebholz, W. N., Bayley-Veloso, R., Altman, J. K., **Cash, E.**, Siwik, C., Hicks, A., Sephton, S. E. (2016) Association of Dispositional Mindfulness with Stress, Cortisol, and Well-being Among University Undergraduate Students. *Mindfulness*, 1-12.

**Complete List of Published Work**

[www.ncbi.nlm.nih.gov/sites/myncbi/1-9rqz7dmVdAK/bibliography/47299007/public/?sort=date&direction=ascending](http://www.ncbi.nlm.nih.gov/sites/myncbi/1-9rqz7dmVdAK/bibliography/47299007/public/?sort=date&direction=ascending)