Aerodigestive Research Core Laboratory

2023 Clinical Fellowship in Speech-Language Pathology

Clinical Fellowship Position Details:

- *Length:* 12-months.
- *Type:* Full time (40 hours per week).
- *Setting:* Working across NIH funded studies (see study descriptions) that will be performed both in outpatient lab settings, the Cardiac ICU, Neuro ICU, and Congenital Heart ICU settings.
- *Mentorship*: The CF will receive one-on-one mentorship from a team of experienced adult and pediatric Speech-Language Pathologists who currently work in the ARC lab including Olivia Brooks, Kayla Croft, Lauren DiBiase, and Emily Plowman.

Application Details:

- CV and/or Resume
- At least two Letters of Recommendation
- Phone References
- Cover Letter highlighting why you would like to complete your Clinical Fellowship in the ARC Lab
- Goals for your Clinical Fellowship and where you hope to work post-fellowship
- *Application Deadline:* April 30th, 2023

Please send all application documents to kaylacroft@ufl.edu

Fellowship Features:

- *Development of Skill Proficiencies*: During the CFY the fellow will have direct, hands-on training to develop proficiencies across inpatient and outpatient settings in the following areas:
    - Performing and interpreting Videofluoroscopic Swallow Studies (VFSS).
    - Performing and interpreting Fiberoptic Endoscopic Evaluations of Swallowing (FEES).
    - Performing and interpreting a comprehensive bulbar mechanism and upper aerodigestive tract exam including: pulmonary function testing, speech testing, cough spirometry testing, peak cough flow testing, reflexive cough testing, lingual strength testing, and administration of Patient Report Outcomes.
    - Completing validated outcomes of swallowing (current ones listed but likely to expand).
        - Penetration Aspiration Scale (PAS)
        - Dynamic Imaging Grade of Swallowing Toxicity (DIGEST)
        - Yale Residue Scale (YRS)
        - New Zealand Secretion Severity Scale (NZSS)
        - Secretion Severity Scale (SSRS)

  Our current CFs have each performed hundreds of ratings to be exceptionally proficient at rating and interpreting ISE's. In addition, they have each performed >70 FEES passes during their fellowship and administered >50 VFSS studies. These numbers may vary year-to-year based on current studies in the lab but we do expect they will be similar or even higher in the coming year.

- *Didactic Experiences:* During the fellowship you will attend monthly laryngology rounds with our ENTs, a weekly ARC lab meeting, journal clubs and also have the opportunity to attend cardiac ICU daily rounds and observe cardiovascular and ENT surgeries. Dr. Plowman and the team have particularly close relationships

with the adult and pediatric heart surgeons and the laryngologists, and we communicate daily with these individuals.

- *Research Project and Experiences*: Given that this is a research laboratory, the CF will be afforded time to work on a research project of their choosing and be allowed to attend multiple conferences where they can learn and, if desired, present their work. Our current CF's each did first author presentations at both the Dysphagia Research Society and NEALS conferences.

- *Teaching*: Additionally, the CF would serve as TA and would assist Dr. Plowman in her Dysphagia class and have the opportunity to both review this content and build their CV in this area (Spring 2024).

- Please note this is *not a traditional CF,* you will see less patients overall but have the opportunity to 'dive deep' in all that you do and collaborate with some of the leaders in the field. It has a heavy emphasis on evaluation and learning how to collect and analyze data (clinical data and instrumental data).

Summary of Current Clinical Trials in the ARC Lab

1. *Me*chanisms, Predictors & Clinical Markers of Dysphagia in Cardiac Surgical Patients (Drs. Plowman, Jeng)

This study is performed in the cardiac ICU setting and the CF would be heavily involved in collecting and analyzing data during their fellowship and this would make up a major portion of their load.

Dysphagia (swallowing impairment) is a common complication of cardiac surgical procedures, leading to malnutrition, dehydration, aspiration pneumonia, reintubation, increased health care utilization, length of hospitalization, and economic burden. Although preventable, dysphagia-related aspiration pneumonia is a major cause of mortality. Early detection and accurate monitoring of dysphagia are therefore important to facilitate timely interventions to mitigate developing sequelae. Currently, clinical care of dysphagia is hindered by fundamental gaps in knowledge, including 1) contributing risk factors of dysphagia are unknown, prohibiting the use of triaged personalized care pathways; 2) no validated tools to accurately detect and monitor dysphagia in the cardiac intensive care unit exist; and 3) governing mechanisms of swallowing impairment and recovery of function are unknown, impeding the development of mechanistically guided therapeutics and optimization of salient postoperative evaluation time points. Our three specific aims target these knowledge gaps with the broad goal to shift care toward a proactive, multifaceted, and data-driven perioperative Model of Swallowing Integrated Care (MOSAIC). To this end, we will *enroll 360 cardiac surgical patients over a four-year period and identify 1) independent risk factors for dysphagia, 2) sensitive clinical markers of swallowing impairment, 3) governing physiologic mechanisms of unsafe and inefficient swallowing throughout the acute, sub-acute, and long-term postoperative period.* Enrolled participants will undergo a preoperative Fiberoptic Endoscopic Evaluation of Swallowing (FEES) to screen out patients with pre-existing dysphagia. Candidate predictor variables will be systematically collected throughout the perioperative time course. Following surgery and within 48 hours of extubation, a simultaneous videofluoroscopy and FEES (VF-FEES) will be performed as well as a battery of simple bedside clinical tests. Detailed blinded analyses will be performed using validated metrics of swallowing safety, efficiency, timing and kinematics to examine acute-phase swallowing function and associated physiologic mechanisms of unsafe or inefficient deglutition. Patients with acute postoperative phase dysphagia will be re-examined at one- and six-months to determine sub-acute and long-term dysphagia trajectories and governing mechanisms of impairment and recovery. Multivariable modeling of dysphagia risk factors will produce a practical dysphagia risk stratification tool to enable accurate forecasting and personalized triaged postoperative care pathways. An accompanying open-access electronic application will be developed to provide seamless clinical adoption and a data-driven clinical decision-making tool. The discriminant ability of clinical markers will be determined, and a practical bedside dysphagia screening tool will be validated to enable accurate detection and monitoring of dysphagia in the cardiac intensive care unit. Outcomes will drive future targeted therapeutic and preventative strategies and enhance personalized health care models to ultimately improve patient outcomes.

2. Establishing Reference Values & Clinical Decision Points for Quantitative Videofluoroscopic Measures of Swallowing. (Drs. Catriona Steele and Emily Plowman)

The CF would be involved in data collection in the cardiothoracic & Neuro ICU cohorts to send to Dr. Steele's lab.

Dysphagia (swallowing impairment) is a serious health condition seen in many age-related disease and injury processes. Although videofluoroscopy (VF) is an international "gold standard" dysphagia diagnostic exam, there is a paucity of available normative physiologic VF reference values in healthy adults across the age span to guide interpretation of this examination. This fundamental gap in knowledge contributes to poor agreement in the identification of swallowing impairment and its underlying mechanisms. To enable better dysphagia diagnostics, there is a critical need to establish reference values for VF swallowing measures across the healthy age span. In our previous R01 (DC011020), we developed a rigorous method for measuring swallowing physiology from VF: the Analysis of Swallowing Physiology: Events, Kinematics and Timing (ASPEKT Method). We published initial ASPEKT reference values from 40 young healthy adults (<60 years) and performed preliminary analyses to compare data from healthy older adults and small cohorts of adults with dysphagia to these reference data. Through this renewal application, we will validate the ASPEKT Method healthy reference values for swallowing across the adult life span, demonstrate scalability of the ASPEKT Method across commonly used variations in clinical VF testing protocols, and profile swallowing pathophysiology in clinical groups where dysphagia is a cause of morbidity to identify clinical decision points that can be used for diagnosis and outcome measurement. Our vision is that the ASPEKT Method will enable clinicians to compare patient measures to healthy reference values, facilitating quantification and evidence- based interpretation of the presence, nature and severity of swallowing impairment. Ultimately, we seek to generate data that will shift subjective dysphagia diagnostic practices toward a quantitative, evidence-based diagnostic framework that will improve resource utilization, treatment planning and patient outcomes.

3. Dissemination & Implementation of DIGEST as an evidenced-based measurement tool for dysphagia (Drs. Kate Hutcheson, Emily Plowman, Nicole Rogus-Pulia).

The CF would be involved potentially in some aspects of this study – including providing ratings of collected data.

Dysphagia (difficulty swallowing) is a highly prevalent and impactful condition with significant burden on the healthcare system. Across the lifespan, dysphagia is associated with excess risk of mortality, increased length of stay, aspiration pneumonia, and malnutrition thereby elevating medical costs and resource utilization. Not only a health problem, dysphagia also adversely affects quality of life and daily function with disproportionate impact on cancer survivors. Adoption of evidence-based methods into clinical practice lags decades behind discovery. One such gap is adoption of evidence-based practices (EBP) by speech-language pathologists in dysphagia management. Evidence-based dysphagia care begins with evidence-based swallowing evaluation. Significant progress has been made in the field of dysphagia to develop evidence-based evaluation methods, with particular emphasis on physiologic characterization of swallowing. The relative safety and efficiency of swallowing, that is how well a food or liquid bolus is kept out of the airway and clears fully through the pharynx into the esophagus, is a fundamental driver of clinical decision making – yet, remains inconsistently assessed and reported in clinical practice. To address this gap, the investigators' developed DIGEST™ (Dynamic Imaging Grade of Swallowing Toxicity). DIGEST is an EBP tool to grade the severity of pharyngeal dysphagia based on results of a radiographic (videofluoroscopic) modified barium swallow (MBS) study. DIGEST uses a basic flowsheet and rubric (available open access via PMC) to summarize the patterns of penetration/aspiration and pharyngeal residue observed on the MBS as markers of swallowing safety and efficiency. DIGEST is a pragmatic yet robust measure validated in the head and neck cancer population, and adopted into routine practice at the PI's institution with over 11,000 MBS graded in the clinic using the methodology since development in 2016. Peer-reviewed research shows adoption of DIGEST in external academic medical settings and federally funded clinical trials. Despite this promise, several obstacles still limit widespread adoption in routine cancer care. These include scalability to fit diverse clinical contexts outside the PI's environment and uncertainty about best implementation strategies. The long-term goal of this project is to improve dysphagia care and patient outcomes through reliable adoption of DIGEST into routine clinical practice. Our central hypothesis is that DIGEST scales-up maintaining validity in diverse cancer populations under common clinical practice variations with reliable

adoption facilitated by an active implementation strategy. The objective of this application is to use dissemination and implementation (D&I) science to accomplish the following **Specific Aims**: 1) demonstrate validity of DIGEST in diverse oncology populations and imaging acquisition protocols, 2) examine context and fidelity of natural dissemination of DIGEST in real-world, early adopters, and 3) evaluate active implementation strategies to improve reach and fidelity of DIGEST in clinical practice. With dense multi-site networks and content expertise, the investigators are uniquely equipped to conduct the proposed D&I project. We expect this work to improve care by narrowing the research-to-practice gap in dysphagia diagnostics.

4. Safety & Therapeutic Potential of Metformin Drug for in indivdiuals with C9orf72 ALS (Drs. Ranum, Plowman, Wymer)

This is a funded study from the DoD and ALS Association where we work with a neurologist and geneticists/basic scientist to test swallowing and respiratory function in patients before a new drug and over time. It is relatively much less work and time than the first two studies but is exposure to working w ALS and we anticipate just a few exams each month.

A repeat expansion in the C9ORF72 gene is known to be the most common cause of familial and sporadic amyotrophic lateral sclerosis. While there are currently no effective treatment strategies for ALS, reducing the levels of toxic proteins produced by repeat associated non-AUG (RAN) translation has been shown to improve disease phenotypes in a number of preclinical models. Our team has shown that metformin, a well-tolerated type-2 diabetes drug, inhibits a key pathway important for RAN translation in preclinical studies. Metformin-treated C9-BAC transgenic mice showed decreased RAN protein levels, improved behavior, and increased motor neuron survival (Zu et al., PNAS 2020). To test the safety and potential efficacy of metformin in C9orf72 ALS patients, this open label Phase 2 clinical trial will test if metformin reduces RAN proteins and is safe in C9orf72 ALS patients. Molecular, functional and imaging studies will be used to identify biomarkers for a larger multi-site placebo-controlled trial. If successful, repurposing metformin would provide a low-cost treatment that is available to treat the most common genetic form of ALS.

5. Dysphagia in Congenital Heart Disease: Risk Factors, Bedside Markers, and Health-Related Outcomes (Drs. Plowman, Bleiweis)

If the CF had interest in Peds' that could also assist with this project and some ancillary experience and skill development.

This pilot award supports a new collaboration with Dr. Mark Bleiweis to investigate mechanisms of swallowing impairment and failure to thrive in neonates and infants undergoing cardiac surgical procedures. Neonates and infants are examined before and after cardiac surgical procedures using a non-nutritive suck device and FEES.

Finally, we also have an unfunded study looking at ***Simultaneous VF and FEES*** that you could be involved in!

You can check out more descriptions of our current and past studies here:

- Clinical Trials.Gov:
  https://clinicaltrials.gov/ct2/results?cond=&term=Emily+Plowman&cntry=&state=&city=&dist=

- ARC Website:
  https://arc.phhp.ufl.edu/our-publications/

Meet the Aerodigestive Research Core

Speech-Language Pathologists

ARC
Aerodigestive Research Core

Dr. Emily Plowman, Ph.D., CCC-SLP
Principal Investigator of the Aerodigestive Research Core Laboratory
Full Professor at the University of Florida

Kayla Croft, M.A., CCC-SLP
Speech-Language Pathologist
Research Study Coordinator
Primary Populations: Cardiothoracic Intensive Care Unit & Adult Outpatient Studies (ALS, Post-Cardiac Surgery, Healthy)

Olivia Brooks, M.A., CCC-SLP, NTMTC
Speech-Language Pathologist
Research Study Coordinator
Primary Population: Pediatric Congenital Heart Defect Intensive Care Unit