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MENTOR LETTER OF COMMITMENT AND RECOMMENDATION

Primary Mentor: Katherine C. Hustad, PhD, CCC-SLP, Professor Communication Sciences and Disorders

Dear Colleagues,

I am delighted to offer my strongest support for Dr. Helen Long, who is applying for a TL1 Post Doctoral Fellow position within UW's Institute for Clinical and Translational Research (ICTR). I am very pleased to serve as Dr. Long's Mentor for the award period. In the letter below, I will elaborate on Dr. Long's qualifications, her training and career development, and my own experience with and commitment to mentoring.

Qualifications of the applicant:
Dr. Long is an ideal candidate for the ICTR TL1 postdoctoral training program. Dr. Long came to my laboratory directly out of her doctoral program at the University of Memphis in spring of 2021. Dr. Long has identified a critically important research direction; she is poised to tackle the problem of early identification of speech deficits in infants who have or are at risk for cerebral palsy. Data suggest that 50% of children with CP have dysarthria, but our current capabilities do not allow us to definitively differentiate those with dysarthria from their peers without dysarthria until 4 years of age because of critical overlaps between developmental features of speech, developmental speech delays, and clinical features of dysarthria. Because we currently cannot identify dysarthria in children with CP (particularly those with mild or moderate dysarthria) until 4 years of age, a critical window for speech intervention is missed for many children. The ability to identify biomarkers of dysarthria during early vocal development would revolutionize speech treatment in children with CP and could lead to a profound shift in quality of life and long-term outcomes for these children.

The study of early infant vocal development requires highly specialized training, which Dr. Long received from the leading expert in this area, Dr. D. Kimbrough Oller, during her doctoral education. The research described in this project builds upon Dr. Long's expertise acquired during her doctoral program and extends it to the study of children with CP (or at risk for CP). An additional year of training as outlined in this TL1 application will extend Dr. Long's expertise to include quantitative methods of acoustic analysis under my primary advisement and will position her as one of a very small number of highly specialized scientists in the world with the necessary expertise to study early vocal development in infants at risk for motor speech disorders (secondary to CP). Also, the ability to engage Dr. Kate Bunton from the University of Arizona as an external collaborator is an exciting and unique opportunity for Dr. Long to build a skillset that will set her apart from other researchers studying children with CP. I have a longstanding collegial relationship with Dr. Bunton, dating back to graduate school in the 1990's, and welcome the opportunity to engage her expertise in this project.

Dr. Long has an impressive track record of scholarly productivity to date. This can be seen in her first authored papers as well as her co-authored papers. She is actively involved in the research community, attending meetings, and presenting her work. In the 24 months that Dr. Long has been in my lab, she has been highly motivated to learn new research methods and to publish her work. She has been an author on three published papers from the lab (two first author) and has three additional papers (two as first author) that she is currently writing. She has also submitted several papers from her doctoral work in Memphis during her post doc, including a preliminary study on vocal development in CP that was independently initiated and led by Dr. Long. In addition, Dr. Long has launched a new study using a larger sample of existing data from my lab that has not yet been studied and is nearly finished with coding and analysis. Her ability to move projects forward is impressive. She is very disciplined and diligent with all aspects of her research. Her ideas and her research focus push the needle into new territory that has the potential to revolutionize the paradigm for early identification of motor speech disorders. Her work has significant theoretical and clinical implications.

Dr. Long's academic history encompasses broad based training in the field of speech language pathology. She also holds clinical credentials as a speech language pathologist and has an extraordinarily strong theoretical background focused on evolutionary developmental biology from her doctoral program. During her time with me at the Waisman Center, her training has focused on clinical research and the study of development of speech in children with cerebral palsy. The proposed additional period of intensive postdoctoral training focused on instrumental acoustics in infant vocal development will ensure that she is ideally positioned to launch an independent research career. Furthermore, her proposed training in translational methods will further extend her line of research to directly impact children with CP.

Training and career development:
Dr. Long is uniquely positioned to build her research career in the early detection of speech impairments in infants with and at risk for CP and other neurodevelopmental disabilities. Throughout her research experiences, Dr. Long has primarily utilized perceptual, observational research methods. Although these methods are considered the gold-standard approach for coding and analysis in the field of infant vocal development, Dr. Long and I have agreed that expanding her methodological toolkit is critical to developing her programmatic line of research. The research and training proposed through this award will expand Dr. Long's expertise in instrumental acoustic analyses and will tie acoustic results to perceptual findings using traditional coding of infant vocalizations. This training will provide the necessary experience required to support a more comprehensive approach to characterizing vocal development and will have implications for clinical measurement for early identification of later speech deficits.

I am well positioned to remain as her postdoctoral mentor during this period. As it relates to her first training goal in acoustic analysis and theoretical models, I have significant experience studying acoustic parameters of disordered speech in older children and adults with CP and have published at least 10 papers using acoustic methods (primarily temporal). During her first 2 years of training with me, Dr. Long has not yet sought training in acoustic analysis, as her focus was on acquiring knowledge and skills related specifically to cerebral palsy. Because of her expertise in spectral measures of speech in younger children, Dr. Long and I reached out to Dr. Kate Bunton as a collaborator to support training in this area. Dr. Bunton has extensive research experience in the acoustic, aerodynamic, and articulatory study of vocal production in infants as young as 4 months of age. Together, our combined contributions will directly support Dr. Long's development of expertise in using instrumental acoustic analysis of infant vocalizations to identify risk of speech impairment.

To support Dr. Long's training in developmental acoustic methods, the following activities will occur during the proposed project:

- **Dr. Long will meet with myself for one-on-one meetings weekly, and Dr. Bunton monthly for small-group meetings** to discuss her training and review ongoing progress for acoustic extraction and analysis. I will also remain available as needed to support troubleshooting and answer any questions related to Dr. Long's learning of acoustic methods. I will meet weekly with Dr. Long to discuss ongoing project logistics. Our small-group meetings with Dr. Bunton will occur via zoom monthly for training in the infant acoustics domain and to support ongoing logistics to ensure successful completion of the proposed project.
- **Dr. Long and I will attend and present at the Motor Speech Conference** together. This conference is highly regarded in the motor speech community and will further enrich Dr. Long's training in cutting edge acoustical research and theoretical frameworks for speech motor control. I will encourage Dr. Long to present her research related to this proposal at this conference and we will attend seminars together to discuss the relationship between these seminars and this project in our one-on-one meetings.

Another component of Dr. Long's training is to learn statistical modeling of predictors and outcomes. This goal will be equally supported by myself and Dr. Tristan Mahr, a full-time data scientist in my laboratory. Dr. Mahr is well qualified to provide guidance to Dr. Long regarding data science methods as well as the proposed statistical analyses. He has extensive experience and an outstanding publication history on a dozen papers using advanced statistical modeling methods. He is well versed in using all relevant software, including R and R Studio. I have worked closely with Dr. Mahr as a colleague and collaborator for the past 4 years; together, we have a well-established research paradigm. Dr. Long will benefit not only from learning under Dr. Mahr's tutelage, but also from participation in the scholarly process between Dr. Mahr as a data scientist and myself as a content expert. This opportunity will be particularly unique because Dr. Long will bring her own acoustic data extracted from the existing database of recordings to the interaction.

To support Dr. Long's training in statistical modeling, the following activities will occur during the proposed project:

- **Dr. Long will meet with myself and Dr. Mahr for weekly statistical consultation** and guidance to support her training to conduct the statistical analyses described in her proposal, with particular focus on Aim 2 to conduct cluster analyses. Specifically, Dr. Mahr will meet with us weekly during the data analysis period of the timeline (last 6 months) to support her analyses, interpretations of findings, and manuscript writing. This will not be the only time in which the three of us will interact. We will also continue to meet weekly for large-group laboratory meetings throughout the proposed project period. This time can be used for ongoing logistical planning as it arises prior to the analysis period of the proposal.

Each of these goals directly relates to Dr. Long's career goals. Specifically, training in acoustic analysis and theoretical frameworks will expand her methodological toolkit to study vocal biomarkers of speech impairment in CP. Training in acoustic methods also supports her long-term goal to develop and validate diagnostic tools for speech and communication impairments in CP and other neurodevelopmental disabilities. Automated vocal analysis is increasingly used for dense sampling of vocalizations in all-day recordings to identify risk of impairment. These methods of analysis require computational acoustic extraction analysis, which Dr. Long will learn through this TL1 post doc. Given Dr. Long's interest in early detection, it is critical to continue to develop Dr. Long's expertise in statistical modeling of developmental trajectories.

Dr. Long has also outlined several workshops, trainings, and courses to support her ongoing training needs in clinical and translational research. She will independently participate in these activities to gain knowledge for 1) developing conceptual knowledge across topics in clinical and translational research, 2) conducting responsible and ethical research, 3) enhancing her mentorship skills, and refining her grant skills. **During our weekly 1:1 meetings, Dr. Long and I will discuss her learning across these activities and how this information can be applied in laboratory, classroom, and community settings.** Through successful completion of this research and career training plan, Dr. Long will be well prepared to conduct rigorous research, develop an independent laboratory, and launch her research career in the early detection of speech and communication impairments in CP and other neurodevelopmental disabilities.

Mentor commitment:

I will serve as Dr. Long's Primary Mentor throughout the 12-month duration of the proposed project period. Dr. Long's mentorship team will also include two significant contributing consultants: Dr. Kate Bunton, University of Arizona, to support her training in instrumental acoustic analysis, and Dr. Tristan Mahr, Waisman Center, to support her training in statistical modeling. I will support all aspects of Dr. Long's research and professional development training goals as described in this document and throughout her proposal. All members of this training plan will meet regularly as described across the project period to maintain consistent communication regarding Dr. Long's training efforts and to support the research conducted under this proposal.

I am committed to having weekly individual and groups meetings with Dr. Long as part of this award. We will meet face to face, and she already has an office and a computer workstation in my laboratory, which is located adjacent to my office on the 4th floor of the Waisman Center. Dr. Long will have access to all of the resources of my laboratory, staff, and the R01 grants that support it. Of particular note is that my laboratory has collected the largest, longitudinal recording database in the world of infants at risk for CP. We have followed ~50 infants prospectively identified for a risk of CP based on their birth history since 2018, outside of the database of >100 children across 20 years. Dr. Long's proposed project includes 23 children from this dataset who have naturalistic, parent-child recordings available for analysis around 12 months of age. Dr. Long's work differs from my own in that she is interested in the development of pre-linguistic vocal behaviors (i.e., babbling) under 24 months, whereas my work has focused on linguistic vocal behaviors that begin with the onset of words and the development of intelligible speech, which can only be studied at speaking ages. Together, our interests dovetail nicely, with some areas of overlap but also very clear differences.

I will work with Dr. Long to support her data reduction and analyses, to develop manuscripts for dissemination, and to begin to develop an early career K or R award. I will also work with her as she begins to navigate the academic job market throughout the project period, providing mentorship as needed for preparing a job talk, negotiating on the job market, setting up a laboratory, and mentoring students. I am committed to attending

the ICTR TL1 post doc biannual scholar/mentor meetings, participating in mentor training activities, and taking part in TL1 mock reviews and monthly seminars. If Dr. Long is awarded a position in the TL1 post doc program, I will ensure that the ICTR grant is cited on her work.

Mentoring experience:
My laboratory has served as a training environment for seven predoctoral and four postdoctoral researchers studying speech, language, and communication development in individuals with CP across childhood. These trainees have developed outstanding clinical research and translational skills in my laboratory and in the rich multidisciplinary intellectual environment of the Waisman Center. Four of these trainees have successfully transitioned into research faculty positions at universities around the country with high or very high research activity. I regularly devote a significant portion of my time to interact with my trainees during one-on-one, small group, and laboratory meetings to support their research, manuscript writing, grant writing, and professional development. To date, one previous predoctoral trainees has received an F31; three others have received highly competitive internal grant awards. All of my trainees have exceeded their training goals and have developed into productive independent investigators. Previous trainees from my laboratory are listed below:

Name	Years in lab	Present employer	Present Title
Jimin Lee	2005-2010	Penn State University	Associate Professor
Amy Delaney	2005-2010	Marquette University	Assistant Professor
Kristen Allison	2011-2015	Northeastern University	Assistant Professor
Ashlyn Smith	2012-2014	Special Olympics, Washington DC	Director of Research and Evaluation
Meghan Darling-White	2013-2015	University of Arizona	Assistant Professor
Emily McFadd	2010-2017	California State University, Los Angeles; University of California Los Angeles	Lecturer; speech-language pathologist

Previous formal mentor training:
I have been actively engaged with mentoring at all levels from undergraduate students to early career junior faculty members. I am a primary mentor for four Assistant Professors at UW, and also work closely as a peer mentor with junior faculty (primarily women) in my field at several universities in the US, and one in Australia. I am deeply commitment to supporting the career development of the next generation of scholars. Mentorship is a critically important means to advance the research base for early career scholars.

I have not engaged in previous formal mentor training but have noted UW's Advancing Research Mentoring Practice Workshop with a great deal of interest. I intend to participate in this but was not available during the offered time windows for 2023. The importance of formal mentor training has been a topic of discussion within my home department, Communication Sciences and Disorders, for some time. I look forward to engaging in the opportunities to advance my mentoring in the near future.

In summary, I believe that Helen Long is an ideal candidate for ICTR's TL1 post doc award. She has outstanding research skills and a critically important research agenda that has the potential to change how we identify dysarthria in children with CP and in turn improve quality of life for these children. I believe that she will be a leader in the field and that this award will be the final training that she needs to begin a research career. It is an honor and a pleasure to mentor her and I will do everything I can to ensure that she is able to advance this critical line of research.

Sincerely,

DocuSigned by:
Katherine Hustad
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