

**BIOGRAPHICAL SKETCH**NAME: **Fumiko Hoeft (aka MAEDA), M.D., Ph.D.**

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

POSITION TITLE: Professor, Department of Psychological Sciences, University of Connecticut (UConn)

**EDUCATION/TRAINING**

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Keio Univ Sch of Med, Tokyo, Japan	BSc/MD	03/1995	Medicine
Keio Univ Sch of Med, Dept Neuropsychiatry	Residency	04/1998	Psychiatry Clinical Neurophysiology
Harvard Med Sch, BIDMC, Dept Neurology, MA (Advisor: Alvaro Pascual-Leone MD PhD)	(Predoc)	03/2000	Neurophysiology
California Inst of Tech, Div Biology, Computation & Neural Systems, CA (Adv: Shinsuke Shimojo PhD)	(Predoc)	03/2003	Systems Neuroscience
Keio Univ Sch of Med, Dept Psychiatry	PhD	10/2003	Neurophysiology & Clinical Neuroscience
Stanford University, Dept Psychology, CA (Adv: John Gabrieli PhD)	Postdoc	03/2005	Developmental Cognitive Neuroscience

**A. Personal Statement**

I am a physician scientist, and developmental cognitive and systems neuroscientist. Currently, I am Director of the Brain Imaging Research Center (BIRC) at UConn with appointments in Psychological Sciences, Mathematics, Psychiatry and Neuroscience. I have theoretical interests in the neurobiological mechanisms underlying individual differences in brain maturational processes, and learning of academic skills such as literacy and reading disorders (RD). In our research, we employ multimodal neuroimaging techniques, analytical approaches (e.g. machine learning, graph theory), and designs (e.g. imaging genetics, intergenerational transmission, human natural cross-fostering design), in typical and atypical populations. ... I have expertise in machine learning (ML); I have developed a toolbox, taught Masters' students in Computer Science at Stanford, and my students and I have published extensively using ML (e.g. Hoeft et al. AGP 08, Etkin et al. AJP 10, Hoeft et al. AGP 11, Hoeft et al. PNAS 11, Bryant et al. JNS 11, Kesler et al. PNAS 13). ... Prior to my current appointments, I was faculty at Stanford University, and managed a number of NIH-funded large-scale multisite collaborative neuroimaging projects (2008-2018) as well as founded multi-university initiatives (e.g. Co-Founder/Co-Director of Haskins Global Literacy Hub focused on literacy acquisition across the US and internationally funded by philanthropy; and Founder/Executive Director of the 6 Univ Cal Campus Precision Learning Center funded by the University of CA Office of the President). In addition, I have mentored over 9 junior faculty, 23 postdoctoral, and 34 predoctoral students as their primary mentor. Therefore, my experience in (1) interdisciplinary research on relevant topics; (2) running multi-site collaborations; and (3) having experience running a number of NIH grants; uniquely qualify me to serve as the PI on this proposal.

**OTHER PUBLICATIONS**

- Maeda(Hoeft) F**, Kanai R, Shimojo S. Changing pitch induced visual motion illusion. *Curr Biol* 2004; 14(23):R990-R991. PMID: 15589145.
- deCharms RC, **Maeda(Hoeft) F**, Glover GH, Ludlow D, Pauly JM, Soneji, D.J., Gabrieli, J.D.E., and Mackey, S.C. Control over brain activation and pain learned by using real-time functional MRI. *PNAS* 2005; 102(51): 18626-18631. PMID: 16352728 PMCID: PMC1311906. Evaluated: F1000 Biology. Coverage: Nature, Nat Rev Neurosci
- Hoeft F**, Gabrieli JD, Whitfield-Gabrieli S, Haas BW, Bammer R, Menon V, Spiegel D. Functional brain basis of hypnotizability. *Arch Gen Psychiatry* 2012 Oct;69(10):1064-72. PMID: 23026956 PMCID: PMC4365296. Press release: NICHD, Stanford; Author ITV in: Arch Gen Psychiatry

- d. Kesler SR, Wefel JS, Hosseini SM, Cheung M, Watson CL, **Hoeft F**. Default mode network connectivity distinguishes chemotherapy-treated breast cancer survivors from controls. *PNAS* 2013;110(28):11600-5. PMID: 23798392; PMCID: PMC3710809.

## B. Positions and Honors

### POSITIONS AND EMPLOYMENT

- 2003 - 2007 Visiting Scientist, Division of Biology, California Institute of Technology, CA USA  
2005 - 2011 Instructor ('08-'11), Senior Research Scientist ('06-'08), Research Associate ('05-'06), CIBSR, Stanford Univ Sch of Med (SOM), CA USA  
2008 - 2011 Associate Director of Neuroimaging Applications, CIBSR, Stanford Univ SOM, CA USA  
2012 - 2013 Visiting Associate Professor, Stanford Univ SOM, CA USA  
2012 - 2018 Deputy Director, Dyslexia Center, UCSF, CA USA  
2017 - 2018 Executive Director, Precision Learning Center (PreCL), Univ of CA, CA USA  
2012 - Adjunct Professor ('18-), Professor ('17-'18), Associate Professor ('12-'17) of Psychiatry & Weill Institute for Neurosciences, UCSF, CA USA  
2012 - Director, brainLENS Laboratory, UConn, CT ('18-) / UCSF, CA ('12-) USA  
2012 - Senior Research Scientist, Haskins Laboratories, Yale Univ & UConn, CT USA  
2012 - Adjunct Faculty, Keio University School of Medicine, Dept of Neuropsychiatry, Tokyo Japan  
2018 - Co-Director, Haskins Global Literacy Hub, CT USA  
2018 - Professor of Psychological Sciences, UConn, CT USA  
2018 - Director, Brain Imaging Research Center (BIRC), UConn, CT USA  
2018 - Professor of Psychiatry ('18-), Neuroscience ('18-), and Mathematics ('19-), UConn, CT USA

### OTHER RELEVANT EXPERIENCE

- 2015 - 2020 International Dyslexia Association (IDA) Board of Directors; Scientific Advisory Board Co-Chair ('17-); Conference Committee Member ('17-); & Conference Co-Chair ('19-)  
2016 - National Center for Learning Disabilities (NCLD), Professional Advisory Board Member  
2017 - Boon Philanthropy, Educational Board Member  
2015 - Mind Brain and Education [journal] Associate Editor  
2018 - Current Opinion in Behavioral Sciences [journal] Editorial Board Member  
2020 - Frontiers in Human Neuroscience [journal] Associate Editor

### SELECTED HONORS

- 2005 Mind Science Foundation, Tom Slick Research Award in Consciousness  
2007 & 2008 Lucile Packard Foundation for Children's Health, Spectrum Child Health & Clinical & Translational Science Award  
2008 Stanford University, Postdoctoral Mentor Award (Honorary Mention)  
2008 Brain & Behavior Research Foundation, Young Investigator Award  
2008 NICHD, Career Development Award (K23)  
2012 NIH, Director's New Innovator Award (DP2; finalist)  
2014 UCSF, Academic Senate Award for Junior Investigators  
2014 IDA, Norman Geschwind Memorial Award  
2015 White House, Remarks at the OSTP meeting on Neuroscience of Learning  
2015 UNESCO, Participation in the UNITWIN Network "Inclusive literacy for all"  
2015 Learning & the Brain Foundation, Transforming Education through Neuroscience Award  
2017 University of CA Office of the President (UCOP), Multicampus Research Programs & Initiatives (MRPI) Award  
2018 Northern CA Branch of IDA, Award for Significant Contribution  
2018 International Mind Brain and Education Society (IMBES), Translation Award  
2018 Society for Neuroscience (SFN), Science Educator Award  
2019 Eye to Eye National, Academic Excellence Award

## C. Contributions to Science

Total of over 160 publications including 125 peer-reviewed publications (28 first, 46 senior author).  
Complete list of peer-reviewed work since my name changed to Hoeft in 2006 (except those in Japanese)

can be found in MyBibliography.

## 1. TMS NEUROPHYSIOLOGY

My early publications that led to my PhD thesis examined cortical excitability and neurophysiological mechanisms underlying transcranial magnetic stimulation (TMS) and its application. We provided the first and direct evidence of individual variability in cortical excitability using TMS. I served as the primary investigator mentored by Dr. Alvaro Pascual-Leone at Harvard in all studies. I also created a double-blind sham TMS coil and performed validation using computational modeling, psychophysics, and neurophysiological properties. The work was funded by NSF, and I served as the primary investigator on the grant and project from grant preparation to execution of the study. Finally, I currently serve as PI on an NIH R01 that uses a combination of TMS and MRI as proposed in this project (R01HD094834).

- a. **Maeda(Hoeft) F**, Keenan J, Pascual-Leone A. Interhemispheric asymmetry of motor cortical excitability as measured by transcranial magnetic stimulation in major depression. ***Br J Psychiatry*** 2000;177:169-173. PMID: 11026958; Comment in: *Br J Psychiatry* 2000;177:468
- b. **Maeda(Hoeft) F**, Keenan J, Tormos JM, Topka H, Pascual-Leone A. Interindividual variability of the modulatory effect of repetitive transcranial magnetic stimulation on cortico-spinal excitability. ***Exp Brain Res*** 2000; 133:425-30. PMID: 10985677
- c. **Maeda(Hoeft) F**, Kleiner-Fisman G, Pascual-Leone A. Motor facilitation while observing hand actions: Specificity of the effect and role of observer's orientation. ***J Neurophysiol*** 2002;87:1329-1335
- d. **Hoeft F**, Wu DA, Hernandez A, Glover GH, Shimojo S. Electronically switchable sham transcranial magnetic stimulation (TMS) system. ***PLoS One*** 2008 Apr 9;3(4):e1923. PMID: 18398456; PMC2271126.

## 2. BRAIN MECHANISMS OF NEUROGENETIC DISORDERS IN INFANTS & UP

While I was at Stanford University School of Medicine, with a team of investigators such as Dr. Allan Reiss (Stanford) and a team of investigators such as Dr. Joe Piven (UNC), Dr. Ursula Bellugi (Salk Inst), Dr. Julie Korenberg (U Utah), and Dr. Judith Ross (Thomas Jefferson U), we performed a series of neuroimaging studies in neurogenetic conditions such as fragile X syndrome, autism spectrum disorders (ASD), Williams, and 22q11.2 (Velo-Cardio Facial) syndromes to understand the impact of genetics on macrocircuits and behavior. I served as the primary investigator supervised by Dr. Allan Reiss in all studies where I am first author and also served as a mentor on all studies where I am second or second to last author.

- a. **Hoeft F**, Barnea-Goraly N, Haas BW, Golarai G, Ng D, Mills D, Korenberg J, Bellugi U, Galaburda A, Reiss AL. More is not always better: increased fractional anisotropy of superior longitudinal fasciculus associated with poor visuospatial abilities in Williams syndrome. ***J Neurosci*** 2007 Oct 31;27(44):11960-5. PMID: 17978036.
- b. **Hoeft F**, Lightbody AA, Hazlett HC, Patnaik S, Piven J, Reiss AL. Morphometric spatial patterns differentiating boys with fragile X syndrome, typically developing boys, and developmentally delayed boys aged 1 to 3 years. ***Arch Gen Psychiatry*** 2008 Sep;65(9):1087-97. PMID: 18762595; PMCID: PMC2864400. Press release: Stanford
- c. **Hoeft F**, Carter JC, Lightbody AA, Cody Hazlett H, Piven J, Reiss AL. Region-specific alterations in brain development in one- to three-year-old boys with fragile X syndrome. ***PNAS*** 2010 May 18;107(20):9335-9. PMID: 20439717; PMC2889103. Press release: NIMH & Stanford
- d. **Hoeft F**, Walter E, Lightbody AA, Hazlett HC, Chang C, Piven J, Reiss AL. Neuroanatomical differences in toddler boys with fragile x syndrome and idiopathic autism. ***Arch Gen Psychiatry*** 2011 Mar;68(3):295-305. PMID: 21041609. PMC4369209. Comment in: AGP. 2011 Mar;68(3):230-1

## 3. BRAIN MECHANISMS OF LANGUAGE, LITERACY & COGNITIVE DEVELOPMENT IN 5YO & UP

A major piece of my interest and contribution to science in the past decade has been to further our understanding of the brain mechanisms underlying language and literacy development. I serve as the primary investigator for work I am first author during 2006-2007 mentored by Dr. John Gabrieli who is now a professor at MIT, and primary and principal investigator on all studies where I am first or last author on publications from 2008 onward. Our work has centered around both theoretically motivated work and those that has practical application.

- a. **Hoeft F**, McCandliss BD, Black JM, Gantman A, Zakerani N, Hulme C, Lyytinen H, Whitfield-Gabrieli S, Glover GH, Reiss AL, Gabrieli JD. Neural systems predicting long-term outcome in dyslexia. ***PNAS*** 2011 Jan 4;108(1):361-6. PMCID: PMC3017159. Press release: NICHD, Stanford, MIT, & Vanderbilt; Covered by: Science

- b. Myers CA, Vandermosten M, Farris EA, Hancock R, Gimenez P, Black JM, Casto B, Drahos M, Tumber M, Hendren RL, Hulme C, **Hoef F**. White matter morphometric changes uniquely predict children's reading acquisition. *Psychol Sci* 2014 Oct;25(10):1870-83. PMID: 25212581; PMCID: PMC4326021. Press release: UCSF; Podcast: UCSF, NIH
- c. Pugh KR, Frost SJ, Rothman DL, **Hoef F**, Del Tufo SN, Mason GF, Molfese PJ, Mencl WE, Grigorenko EL, Landi N, Preston JL, Jacobsen L, Seidenberg MS, Fulbright RK. Glutamate and choline levels predict individual differences in reading ability in emergent readers. *J Neurosci* 2014 Mar 12;34(11):4082-9. PMID: 24623786; PMCID: PMC3951703. Press release: Yale, NICH
- d. Rueckl JG, Paz-Alonso PM, Molfese PJ, Kuod W-J, Bick A, Frost SJ, Hancock R, Wu DH, Mencl WE, Duñabeitia JA, Lee J-R, Oliver M, Zevin JD, **Hoef F**, Carreiras M, Tzeng OJ-L, Pugh KR, Frost R. A universal brain signature of proficient reading: Evidence from four contrasting languages. *PNAS* 2015 Dec 15;112(50):15510-5. Epub 2015 Nov 30. PMID: 26621710. PMCID: PMC4687557.

#### 4. BRAIN MECHANISMS OF READING DISORDER & THOSE WITH A FAMILY HISTORY (DYSLEXIA)

Related to 3, another major piece of my contribution to science in the past decade has been in the neural mechanism underlying reading disorders (developmental dyslexia), preliteracy multimodal biomarkers especially those with a family history. I serve as the primary investigator for work I am first author during 2006-2007 mentored by Dr. John Gabrieli who is now a professor at MIT, and primary and principal investigator on all studies where I am first or last author on publications from 2008 onward. Our work has centered around both theoretically motivated work and those that has practical application.

- a. **Hoef F**, Meyler A, Hernandez A, Juel C, Taylor-Hill H, Martindale JL, McMillon G, Kolchugina G, Black JM, Faizi A, Deutsch GK, Siok WT, Reiss AL, Whitfield-Gabrieli S, Gabrieli JD. Functional and morphometric brain dissociation between dyslexia and reading ability. *PNAS* 2007 Mar 6;104(10):4234-9. PMID: 17360506; PMCID: PMC1820738.
- b. Tanaka H\*\*, Black JM\*\*, Hulme C, Stanley LM, Kesler SR, Whitfield-Gabrieli S, Reiss AL, Gabrieli JD, **Hoef F**. The brain basis of the phonological deficit in dyslexia is independent of IQ. *Psychol Sci* 2011 Nov;22(11):1442-51. doi: 10.1177/0956797611419521. Epub 2011 Oct 17. PMID: 22006060. PMCID: PMC4380286 Press release: NICHD, Psychol Sci, Stanford & MIT
- c. Hancock R, Richlan F, **Hoef F**. Possible roles for frontostriatal circuits in reading disorder. *Neurobio Beh Rev* 2017 Jan;72:243-260. doi: 10.1016/j.neubiorev.2016.10.025 PMID: 27826071. PMCID: PMC5189679
- d. Hancock R, Pugh KR, **Hoef F**. The neural noise hypothesis of developmental dyslexia. *Trends Cogn Sci (TiCS)* 2017 Jun;21(6):434-448. doi: 10.1016/j.tics.2017.03.008. [Epub ahead of print] PMID: PMID: 28400089; PMCID: PMC548955.

#### 5. INTERGENERATIONAL NEUROIMAGING IN PARENTS & OFFSPRING

My most recent contribution to science has been the examination of the intergenerational transmission patterns in the human brain by use of familial history information, and individual differences in cognitive and neurocognitive phenotypes in parents and offspring dyads, directly in line with the current proposal. We are particularly interested in the language and literacy networks and their underlying cognitive processes. We have had 3 small scale and pilot grants to date.

- a. Black JM, Tanaka H, Stanley L, Nagamine M, Zakerani N, Thurston A, Kesler S, Hulme C, Lyytinen H, Glover GH, Serrone C, Raman MM, Reiss AL, **Hoef F**. Maternal history of reading difficulty is associated with reduced language-related gray matter in beginning readers. *Neuroimage* 2012 Feb 1;59(3):3021-32. PMID: 22023744; PMC3628690.
- b. Yamagata B, Black JM, Gimenez P, Mimura M, Yang TT, Reiss AL, **Hoef F**. Sex-specific intergenerational transmission patterns in the human corticolimbic system. *J Neurosci* 2016 Jan;36(4):1254-60. PMID: 26818513; PMC4728726. Press release: UCSF; Covered by: Scientific American; Dana Foundation
- c. Ho TC, Sanders SJ, Gotlib IH, **Hoef F**. Intergenerational neuroimaging of human brain circuitry. *Trends Neurosci (TiNS)*. 2016 Sep;39(10):644-648. PMID: 27623194. PMC5067069.
- d. **Hoef F**, Hancock R. Chapter 14: Intergenerational transmission of reading and reading brain networks. In A.M. Galaburda, N. Gaab, F. Hoef, P. McCardle (ed). *Geschwind-Galaburda Hypothesis, 30 years Later (The Extraordinary Brain Series)*. Baltimore: Paul H. Brookes Publishing Co., Inc. 2017.

## **D. Additional Information: Research Support and/or Scholastic Performance**

## ACTIVE

- NIH U24AT011281 (MPIs Park, Chafouleas, Hoefft)** 02/01/2021 – 01/31/2025  
Network to advance the study of mechanisms underlying mind-body interventions and measurement of emotional wellbeing (M3 Network of Emotional Wellbeing) To lead a network to deepen our understanding of EWB measurement approaches and their role in MBIs as outcomes and as mechanisms.
- NIH/NIHCD R01HD094834 (MPIs Hoefft/Hancock)** 04/10/2019 – 03/31/2024  
Intergenerational neuroimaging of language and reading networks using a natural cross-fostering design To dissociate the genetic, prenatal and postnatal experience on sex-specific transmission patterns of language and reading endophenotypes.
- NIH/NICHD R01HD096261 (PI Hoefft)** 09/15/2018 – 06/30/2023  
Neural mechanisms underlying compensation in dyslexia To understand the neurocognitive mechanisms underlying compensation in RD adults using a combination of measures of experimental neuromodulation, neurochemistry and neural activity/connectivity.
- NIH/NICHD R01HD078351 (PI Hoefft ('15-18), MPIs w Hendren ('18-))** 09/01/2015 – 06/30/2022  
Understanding literacy acquisition through immersion in foreign languages To examine neurobiological, language and cognitive profiles as children learn a second language.
- NIH/NICHD R01HD086168 (MPIs Pugh/Hoefft)** 08/01/2016 – 06/30/2022  
Neurochemistry as a moderator of brain networks for reading To test our neural noise hypothesis of dyslexia by examining relationships between neurochemistry, neural oscillation, functional activation, and functional connectivity and how these may predict individual differences in reading skills in children. UCSF does not collect data but is the data QC processing and higher-level statistical analyses site.
- NSF BCS-2029373 (PI Hoefft)** 04/15/2020 – 03/31/2022  
Assessing and preventing the detrimental impact of literacy acquisition during COVID-19-related school closure To examine the extent of the detrimental impact of school closure on children's reading at the critical early stages of learning, and the degree to which a digital game-based reading instruction can rescue the expected closure-related slump.
- Oak Foundation OCAY-19-215 (PI Hoefft)** 09/01/2019 – 08/31/2022  
Supporting optimal outcomes for students with learning differences To identify pathways that lead to optimal outcomes in the socio-emotional and cognitive domains by examining stereotype threat and compensation in students with LDs.
- SVCF 2018-188563 (PI Uncapher, Anguera ('19-), Role: Co-PI)** 09/01/2018 – 02/23/2022  
Development and validation of precision learning executive function (PLEF) tool To develop, integrate, and validate cognitive assessment tools.
- NIH/NICHD R01HD094834-A01 (MPIs Landi/Milham, Role: Co-I)** 09/01/2020 – 08/31/2025  
Effectiveness & predictors of response for a technology-based reading intervention in the home To examine effectiveness and predictors of response to EdTech-based reading
- NIH/NIDCD T32DC017703 (MPIs Eigsti/Myers, Role: Co-I, Preceptor)** 07/01/2019 – 06/30/2024  
Training in the cognitive neuroscience of communication To train the next generation of communication scientists to not only understand the underlying neural bases of these disorders, but also on how to bring research from the laboratory to the clinic.
- NIH/NICHD R01HD044073 (PI Cutting, Role: Co-I)** 07/01/2015 – 06/30/2021  
Cognitive and Neural Processes in Reading Comprehension To explore brain development and its relationship of cognitive processes and reading comprehension.

## COMPLETED (< 3 years)

- Oak Foundation ORIO-16-012 (PI Hoefft) 09/01/2016 – 10/31/2020
- NIH/NIMH R01MH104438 (PI Nordahl, Role: Subcontract PI) 07/10/2014 – 03/31/2019
- NIH/NIMH R01MH103371 (PI Amaral, Role: Subcontract PI) 04/01/2015 – 01/31/2020
- UCOP MRP-17-454925 (PI Hoefft, no longer PI because of move to UConn) 01/01/2017 – 12/31/2020
- NSF1540854 SL-CN (PI Gazzaley, Role: Co-PI) 09/30/2015 – 09/29/2018
- NIH/NICHD P50HD052120 (PI Wagner, Role: Subcontract PI) 10/01/2017 – 06/30/2019