
BIOGRAPHICAL SKETCH

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

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

POSITION TITLE: Associate Professor, Dept of Psychiatry, Division of Child and Adolescent Psychiatry, UCSF

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, Tokyo, Japan	Residency	04/1998	Neuropsychiatry Clinical Neurophysiology
Harvard Med Sch, BIDMC, Dept Neurology, MA (Advisor: Alvaro Pascual-Leone MD PhD)	Predoc	03/2000	Neurophysiology
California Institute of Technology, Div of Biology, CA (Advisor: Shinsuke Shimojo PhD)	Predoc	03/2003	System Neuroscience
Keio Univ Sch of Med, Tokyo, Japan	PhD	10/2003	Neurophysiology & Clinical Neuroscience
Stanford University, Dept Psychology, CA (Advisor: John Gabrieli PhD)	Postdoc	03/2005	Developmental Cognitive Neuroscience

A. Personal Statement

I am a physician scientist with great interest in understanding literacy acquisition in typical as well as atypical conditions. Most of my work over the past 13 years at Stanford/UCSF and through collaborations with Haskins Labs and Vanderbilt Univ, has centered around research that leads to furthering our understanding of individual differences in the brain basis of **literacy development and reading disorders (RD), as well as in related learning disabilities, neurogenetic disorders, and English Learners (ELs)**. One major project funded by NICHD (K23HD054720) was to examine the neural circuitries involved in reading acquisition in preliterate kindergarteners followed through 3rd grade, and to identify predictors in children with low and high risks for developing RD. Currently funded by NICHD (R01HD078351), we are examining individual differences in English literacy acquisition in native English speakers and Spanish/Cantonese ELs in CA Public Schools. Other collaborative projects include one that tests a new theory of learning disabilities (R01HD086168), those on reading comprehension (R01HD044073), the role of general learning mechanism in language development (R01HD065794), mechanism of language learning across languages (P01HD001994), and the role of executive function on academic achievement (NSF1540854). I have performed neuropsychological, home environment and neuroimaging assessments in children of ages 1 and up in over 400 children in San Francisco and the surrounding Bay Area. We use cutting-edge MRI neuroimaging acquisition and analytical techniques such as machine learning algorithms and graph theoretical analysis and apply them to MRI, behavioral, demographic and genetic data to identify networks and patterns that are abnormal in patient populations and that predicts outcome as well as the development of the disorder in at-risk populations. We have developed two toolboxes, one on multivariate pattern analysis and on graph theoretical analysis, which are publically available to other laboratories.

I joined UCSF in January of 2012. Prior to that, I was Associate Director of Center for Interdisciplinary Brain Sciences Research (CIBSR) at Stanford (Director: Allan Reiss MD) where I managed a number of large-scale multisite collaborative projects. Currently, in addition to 2 R01 where I am PI, I serve as co-PI /subcontract-PIs on 6 other major federal grants. My role on these projects is to provide consultation on study design, analytical approaches and develop analysis tools as necessary. I have supervised 9 junior faculty, 20 postdoctoral students, and 33 predoctoral students. Therefore, my experience of having worked closely with all key investigators on the current proposal, having held leadership roles in national and international collaborations, having mentored and teaching a large number of students and faculty, as well as my interdisciplinary background of educational, clinical, developmental cognitive sciences, uniquely qualify me to be a PI on this current proposal.

PUBLICATIONS NOT REFLECTED IN SECTION C BELOW

1. 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;36(4):1254-60. doi: 10.1523/JNEUROSCI.4974-14.2016. PMID: 26818513; PMCID: in progress. Press release: UCSF; Covered by: Scientific American
2. Kesler SR, Wefel JS, Hosseini SM, Cheung M, Watson CL, **Hoef F**. Default mode network connectivity distinguishes chemotherapy-treated breast cancer survivors from controls. *PNAS* 2013;110(28):11600-5. PMID: 23798392; PMCID: PMC3710809.
3. **Hoef F**, Gabrieli JD, Whitfield-Gabrieli S, Haas BW, Bammer R, Menon V, Spiegel D. Functional brain basis of hypnotizability. *Arch Gen Psychiatry*. 2012;69(10):1064-72. Erratum in: *Arch Gen Psychiatry* 2013;70(1):97. PMID: 23026956; PMCID: PMC4365296. Press release: NICHD, Stanford; Author ITV in: Arch Gen Psychiatry
4. Etkin A, Prater KE, **Hoef F**, Menon V, Schatzberg AF. Failure of anterior cingulate activation and connectivity with the amygdala during implicit regulation of emotional processing in generalized anxiety disorder. *Am J Psychiatry* 2010;167(5):545-54. PMID: 20123913. PMCID: PMC4367202. Comment in: Am J Psychiatry. 2010 May;167(5):489-92

B. Positions and Honors

POSITIONS AND EMPLOYMENT

- 2003 - 2007 Visiting Scientist, Division of Biology, California Institute of Technology, CA USA
 2005 - 2011 Research Associate ('05-'06), Senior Research Scientist ('06-'08), Instructor ('08-'11), 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 - Associate Professor of Child and Adolescent Psychiatry, UCSF, CA USA
 2012 - Director, Laboratory for Educational Neuroscience (brainLENS.org), UCSF, CA USA

OTHER EXPERIENCE

I. Organizing Committees, Chairs

- President, Organizer, 2003 (Inaugural) World Association for Young Psychiatrists and Trainees (WAYPT) Meeting, May 2003; San Francisco, CA USA
 Consulting Member, UC Council for Postdoctoral Scholars (2003-2004)
 Founding Member, Board Member, WAYPT (2002-2005)
 Member, Poster Committee, Annual CNS Meeting (2009-2013)
 Chair, Mini-symposium, SFN Annual Meeting, Oct 2011; Atlanta GA USA
 Chair, Symposium, Annual AACAP Meeting, Oct 2012; San Francisco CA USA
 Co-organizer, Dyslexia Beyond Reading: Memory, Cognition, Expertise, and Innovation. UCSF – Dyslexic Advantage Joint Scientific Meeting, March 2014; San Francisco CA USA
 Co-organizer, Innovative Learning Conference. October 2015; Hillsborough CA USA
 Co-organizer, The Extraordinary Brain Series, The Dyslexia Foundation. June 2016; St Croix USA Virgin Islands

II. Review Panel, Other Panels and Editorial Board

REVIEW PANEL AND OTHERS

- Member, NICHD's Scientific Vision, Behavior Workshop Organizing Group, 02/'11
 Member, NICHD's Scientific Vision Finale Meeting, 06/'11
 Member, NICHD Learning Disabilities Research Center (LDRC) P50 SEP ZHD1 DSR-H (53), 07/'11
 Member, DoD Cognitive Neuroscience of Second Language Acquisition Meeting, Washington DC, 11/'11
 Member, NIH Forward Focus Workshop: Strategic Planning for the Common Fund, San Francisco, 05/'12
 Member, NIH DP5 Review Panel NH DP5 Review Panel ZRG1 BBBP-E 53 R, 03/'13
 Member, UCSF Faculty Council, Dept of Psychiatry, '13 - 15
 Member, White House OSTP Workshop on Neuroscience and Learning, 01/'15
 Member, UNESCO UNITWIN Working Group on Global Literacy, 05/'15
 Scientific Advisor, Center for Childhood Creativity, Board of Advisors, '12 -
 Member, UCSF Resource Allocation Program (RAP) Career Development Review Committee, '13 -
 Regular contributor, Research Alerts in the Int'l Dyslexia Assn's online newsletter the Examiner, '14 -
 Member, UCSF Research Evaluation and Allocation Committee (REAC), '16-

Member, CA Dept of Ed, Dyslexia State Guideline Implementation Work Group, '16-
EDITORIAL BOARD The Open Medical Imaging Journal '07-, Frontiers in Human Neuroscience '08 -,
Open Journal of Neuroscience '09 -, AERA Open '14-, New Directions in Child and Adolescent
Development (NDCAD; Assoc. Ed) '14 -, Mind Brain and Education (Assoc. Ed) '15-

SELECTED HONORS

2014 Norman Geschwind Memorial Lectureship, International Dyslexia Association
2015 Transforming Education Through Neuroscience Award, Learning and the Brain Fndtn

C. Contribution to Science

Total of 127 publications and 96 peer-reviewed publications (29 first, 23 corresponding author). Complete List of Peer-reviewed Published Work since 2006 (except those published in Japanese) in MyBibliography: <http://www.ncbi.nlm.nih.gov/sites/myncbi/fumiko.hoeft.1/bibliography/40314971/public/?sort=date&direction=ascending>

1. My early publications that led to my PhD thesis examined **cortical excitability and neurophysiological mechanisms underlying transcranial magnetic stimulation (TMS) with a particular emphasis on depression**. 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 and principal investigator on the grant and project.

- a. **Maeda, F.**, Keenan, J., Tormos, J.M., Topka, H. and 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.
- b. **Maeda, F.**, Keenan, J., Tormos, J.M., Topka, H. and Pascual-Leone, A. Modulation of cortico-spinal excitability by repetitive transcranial magnetic stimulation. *Clin Neurophysiol* 2000;111: 800-805.
- c. **Maeda, F.**, Gangitano, M., Thall, M. and Pascual-Leone, A. Inter- and intra-individual variability of paired-pulse curves with transcranial magnetic stimulation (TMS). *Clin Neurophysiol* 2002;113:376-382.
- 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. doi: 10.1371/journal.pone.0001923. PubMed PMID: 18398456; PubMed Central PMCID: PMC2271126.

2. While I was at Stanford University School of Medicine, with a team of investigators such as Dr. Allan Reiss (Stanford), 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** 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.

Many of the projects were related to fragile X syndrome as a human genetic model of a neurodevelopmental disorder autism spectrum disorders (fragile X).

- a. **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](#)
- b. Watson C, **Hoeft F**, Garrett AS, Hall SS, Reiss AL. Aberrant brain activation during gaze processing in boys with fragile X syndrome. *Arch Gen Psychiatry* 2008;65(11):1315-23. PMID: 18981343.
- 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; PMCID: 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. PMCID: PMC4369209. Comment in: *Arch Gen Psychiatry*. 2011 Mar;68(3):230-1

3. Related to 2, **other neurogenetic disorders** such as Williams, 22q11.2 (Velo-Cardio Facial), and XXY

(Klinefelter) Turner (XY) syndromes served as human genetic models of complex traits such as visuo-spatial and socio-emotional and processes (Williams), psychosis (22q11.2), and language processing (XXY, XY).

- a. **Hoef 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. Bryant DM, **Hoef F**, Lai S, Lackey J, Roeltgen D, Ross J, Reiss AL. Neuroanatomical phenotype of Klinefelter syndrome in childhood: a voxel-based morphometry study. *J Neurosci* 2011;31(18):6654-60. PMID: 21543594; PMCID: PMC3148194.
- c. Hong DS, **Hoef F**, Marzelli MJ, Lepage JF, Roeltgen D, Ross J, Reiss AL. Influence of the X-chromosome on neuroanatomy: evidence from Turner and Klinefelter syndromes. *J Neurosci* 2014;34(10):3509-16. PMID: 24599451; PMCID: PMC3942570.
- d. Haas BW, Mills D, Yam A, **Hoef F**, Bellugi U, Reiss A. Genetic influences on sociability: heightened amygdala reactivity and event-related responses to positive social stimuli in Williams syndrome. *J Neurosci* 2009;29(4):1132-9. PMID: 19176822; PMCID: PMC2754840.

4. My most recent contribution to science has been in the neural mechanism underlying **literacy acquisition and learning disabilities such as reading disorders / developmental dyslexia**. We have been applying novel neuroimaging approaches (designs and analytical) to examine the underlying mechanisms. I serve as the primary author 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 theoretically motivated work but also those that has practical application. For example, we have shown that the left posterior brain deficits found in dyslexia is not simply a maturational delay but represents neurobiologically specific aspects of the disorder. Further we have shown that discrepancy in IQ and reading ability do not affect the neural patterns related to poor reading, supporting one of several identification/diagnostic criteria that has been prevalent but controversial in the field. Finally, we have recently shown universal mechanisms underlying the reading by comparing across four very different languages.

- a. **Hoef F**, Hernandez A, McMillon G, Taylor-Hill H, Martindale JL, Meyler A, Keller TA, Siok WT, Deutsch GK, Just MA, Whitfield-Gabrieli S, Gabrieli JD. Neural basis of dyslexia: a comparison between dyslexic and nondyslexic children equated for reading ability. *J Neurosci* 2006;26(42):10700-8. PMID: 17050709. Evaluated: F1000 Biology
- b. **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.
- c. 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. PMID: 22006060. PMCID: PMC4380286. Press release: NICHD, Psychol Sci, Stanford & MIT
- 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. doi: 10.1073/pnas.1509321112. Epub 2015 Nov 30. PMID: 26621710. PMCID: PMC4687557.

5. Related to 4, our work on **reading development** also focused on whether neuroimaging has prognostic value by examining neurobiological correlates beyond BOLD signal such as neurochemistry, and whether neuroimaging patterns at baseline predict literacy acquisition and who learns to compensate in reading ability.

- a. **Hoef 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, **Hoeft 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, NICHD
- d. Preston JL, Molfese PJ, Frost SJ, Mencl WE, Fulbright RK, **Hoeft F**, Landi N, Shankweiler D, Pugh KR. Print-speech convergence predicts future reading outcomes in early readers. *Psychol Sci* 2015 Nov 20. pii: 0956797615611921. [Epub ahead of print]. PMID: 26589242

D. Research Support

ACTIVE

- NIH R01HD078351 (PI Hoeft)** 09/01/2015 – 06/30/2020
Understanding literacy acquisition through immersion in foreign languages To examine neurobiological, language and cognitive profiles as children learn a second language.
- NIH R01HD086168 (MPIs Pugh/Hoeft)** 08/01/2016 – 06/30/2021
Neurochemistry as a moderator of brain networks for reading To test the 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/
- Oak Foundation (PI Hoeft)** 09/01/2016 – 08/31/2019
Assessing the impact of mentoring on students with learning differences To examine change in motivation, resilience and related processes due to mentoring, and predictors of success in LD middle schoolers.
- NSF1540854 SL-CN (PI UCSF/Gazzaley, Role: co-PI)** 09/30/2015 – 09/29/2018
Science of Learning - Collaborative Networks: Contributions of executive function subdomains to mathematical cognition and reading in the classroom: Assessment and training To elucidate how multiple domains of executive functions (EFs) contribute to differences in math and reading in middle childhood.
- NIH R01MH104438 (PI UC Davis/Nordahl, Role: Subcontract PI)** 07/10/2014 – 04/30/2019
Neural Phenotypes of Females with Autism Spectrum Disorder To examine neural mechanisms that differ between females and males with autism spectrum disorders.
- NIH R01MH103371 (PI UC Davis/Amaral, Role: Subcontract PI)** 04/01/2015 – 03/31/2020
Neurophenotypic Trajectories and Behavioral Outcomes in Autism Spectrum Disorder To explore the relationship between brain development, behavioral abnormalities, and cognitive and functional outcome in children with ASD who are transitioning from early to middle childhood.
- NIH R01HD065794 (PI Haskins/Pugh, Role: subcontract PI)** 05/10/2011 – 03/31/2017
Neurological Predictors of Spoken and Written Language Learning This project examines neurocognitive predictors related to procedural learning of oral and written language.
- NIH P01HD001994 (PI Haskins/Rueckl, Role: subcontract PI)** 08/01/2012 – 05/31/2017
The Nature and Acquisition of the Speech Code and Reading To examine language learning using neuroimaging, cognitive psychological, crosslinguistic approaches and computational modeling.

COMPLETED (< 3 years)

- NIH K23HD054720 (PI Hoeft)** 08/11/2008 – 07/31/2013
Predicting Reading Success Using a Multi-Modal Neuroimaging Approach
- UCSF Catalyst Award (PI Hancock, Role: co-PI & mentor)** 03/01/2014 – 06/30/2015
Early Mobile Screening for Reading Disorder Risk
- UCSF RAP Digital Health Research (PI Hancock, Role: co-I & mentor)** 02/01/2014 – 06/30/2015
Early Mobile Screening for Reading Disorder Risk
- NIH R01HD067254 (PI Vanderbilt/Cutting, Role: Subcontract PI)** 09/28/2010 – 07/31/2015
Predicting Late-Emerging RD: Neurobiological and Cognitive Factors
- NIH R01HD044073 (PI Vanderbilt/Cutting, Role: Subcontract PI)** 07/01/2015 – 06/30/2016
Cognitive and Neural Processes in Reading Comprehension To explore the relationship between brain development, and its relationship to behavior and cognition related to reading comprehension.