John D. Simeral

Current Positions

Associate Professor of Engineering (Research)
School of Engineering
Brown University
Providence, Rhode Island

Research Biomedical Engineer
Center for Neurorestoration and Neurotechnology
VA Providence Healthcare System
U.S. Department of Veterans Affairs

Contact

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Education

B.S.   **Electrical Engineering**   Stanford, CA
Stanford University, June 1985

M.S.   **Electrical & Computer Engineering**   Austin, TX
University of Texas at Austin, December 1989
Thesis advisor: Dr. AJ Welch
Thesis Title: *Monitoring and controlling surgical temperatures during laser angioplasty using infrared feedback*

Ph.D.   **Neuroscience**   Winston-Salem, NC
Wake Forest University School of Medicine, June 2003
Dissertation advisor: Dr. SA Deadwyler
Dissertation Title: *Neural coding and dynamics in the rat hippocampus*

Academic Appointments

1994   **Lecturer**   San Diego, CA
Dept. of Electrical and Computer Engineering
University of California San Diego

1996 – 2003   **Doctoral Student**   Winston-Salem, NC
Dept. of Physiology and Pharmacology (Dr. Sam Deadwyler)
Wake Forest University School of Medicine

2003-2009   **Postdoctoral Research Fellow**   Providence, RI
Dept. of Neuroscience (Dr. John Donoghue)
Brown University

2006-2008   **Research Scientist**   Providence, RI
Rehabilitation R&D Service
Dept. of Veterans Affairs Providence Healthcare System

2009-present **Research Biomedical Engineer**   Providence, RI
Rehabilitation R&D Service
Center for Neurorestoration and Neurotechnology
Dept. of Veterans Affairs Providence Healthcare System

2010-2024	**Assistant Professor (Research)**	Providence, RI
	School of Engineering	
	Brown University	

2025-present	**Associate Professor (Research)**	Providence, RI
	School of Engineering	
	Brown University	

Industry Positions

1986-1987	**Research Assistant**, VLSI multichip module development	Austin, TX
	Microelectronics and Computer Technology Corporation (MCC)	

1987-1990	**Engineer**, Custom VLSI CPU design	Rancho Bernardo, CA
	NCR Corp.	

1990-1993	**Principal Engineer**, Memory subsystem and ASIC VLSI design	Torrey Pines, CA
	Teradata and NCR Joint Development Organization	

1993-1995	**Sr. Principal Engineer,** Massively parallel systems development	Rancho Bernardo, CA
	AT&T Corp., Global Information Solutions	

Consulting

2006	**Consultant**, Neural Engineering	Foxborough, MA
	Cyberkinetics Neurotechnology Systems, Inc.	

Teaching

1985-1986	**University of Texas at Austin**
	Dept. of Electrical and Computer Engineering
	Electronics Laboratory (Teaching Assistant).
	Administered and graded multiple weekly electronics labs in an 18-lab engineering core course for Electrical & Computer Engineering seniors

1994	**University California San Diego**
	Dept. of Electrical & Computer Engineering
	Microelectronic System Design (Fall)
	28 lecture course, assignments and tests for ECE / EE seniors

2005-2007	**Brown University** School of Medicine
	Neuroanatomy (Spring)
	Lectures and gross anatomy lab (80 1st-year medical students, 3-4 lectures, 2 labs)

2007	**Brown University** Dept. of Neuroscience
	Neurotechnology (Fall)
	Lecture

2006, 2007	**Brown University** Dept. of Neuroscience
	Cognitive Neuroscience (BN166, Spring)
	Lecture

2007-2010	**Brown University** Dept. of Biology
	Biomaterials (Bio 112, Spring)
	Lecture

2018	**Brown University** Dept. of Computer Science
	Creating modern web applications (CS 132, Spring)
	Faculty advisor for semester-long group projects in web development

2020	**Brown University** School of Engineering
	Neuroengineering (ENGR 1220, Spring)
	Lecture

2021	**Brown University** Division of Biology
	From Neurons to Consciousness (NEUR 1500, for MA in Biology, Spring)
	Lecture

2015, '17-'24	**Brown University** School of Engineering
	Transforming Society – Technology and Choices for the Future (ENGN 0020, Spring)
	Lecture

Research Grants and Fellowships

Current support

2024 – 2028   Dept. Veterans Affairs Merit Review Award, A4820-R (Hochberg, PI)
Rapid neural typing interface for Veterans with ALS
$2,285,578 (Total award, 4 years)
CO-INVESTIGATOR

2023 – 2026   CDMRP AL220043 (Stavisky, PI - UC Davis)
Brain-computer interface for voice synthesis in people with ALS
$290,741 (Total site award to Brown, 3 years)
PRINCIPAL INVESTIGATOR on subcontract to Brown

2022 – 2027   Dept. Veterans Affairs Merit Review Award, A3803-R (Simeral, PI)
Enhancement and optimization of a mobile iBCI for Veterans with paralysis
$1,198,474 (Total award to Providence VA, 5 years)
PRINCIPAL INVESTIGATOR

2021 - 2026   NIH-NIDCD, U01DC019430 (Henderson, PI - Stanford)
Single-neuron population dynamics in human motor cortex for a speech prosthesis
$317,241 (Total site award to Brown, 5 years)
PRINCIPAL INVESTIGATOR on subcontract to Brown

2021 - 2026   NIH-NINDS, U01NS123101 (Henderson, PI - Stanford)
Cortical basis of complex motor sequences in humans for neural interfaces
$1,140,876 (Total site award to Brown, 5 years)
PRINCIPAL INVESTIGATOR on subcontract to Brown

2020 - 2025   NIH-NIDCD, R01DC014034 (Henderson & Shenoy, PIs - Stanford)
Engaging new cognitive and motor signals to improve communication prostheses
$162,110 (Total site award to Brown, 5 years)
PRINCIPAL INVESTIGATOR on subcontract to Brown

2019 - 2025   NIH-NIDCD , U01DC017844 (Hochberg, PI)
Intuitive, complete neural control of tablet computers for communication
$4,030,513 (Total, 5 years; extension)
CO-INVESTIGATOR

Proposals pending

None.

Proposals submitted / in submission

> Dept. Veterans Affairs Merit Review Award (Simeral, PI)
> <u>Transforming BCIs for Veterans with paralysis – empowering independent use</u>
> $1,199,528 (Total award to VA Providence Healthcare System, 4 years)
> PRINCIPAL INVESTIGATOR

Completed support

2024   SPRINT Undergraduate Teaching and Research Award (summer)
<u>C programming for a Linux ARM processor for the BrainGate BCI</u>
FACULTY ADVISOR for Brown undergraduate awardee Damir Kulzhanov

2023   Undergraduate Teaching and Research Award (summer)
<u>Computer modeling of intracortical neural signals</u>
FACULTY ADVISOR for Brown undergraduate awardee Natalie Herrick

2020 - 2024   NIH-NINDS, U24NS113637-01A1 (Starr, PI – UCSF & Borton, PI - Brown)
<u>Accelerating dissemination of implantable neurotechnology for clinical research</u>
$835,000 (Total site award to Brown, 5 years)
NAMED INVESTIGATOR

2020 - 2022   ALSA, 20-MALS-553 (Hochberg, PI)
<u>Enabling independent home use of an intracortical Brain-Computer Interface for control of multiple communication devices.</u>
$200,000 (Total, 2 years)
NAMED INVESTIGATOR

2019 - 2022   AHA 19SCLOI34780000 (Hochberg & Walsh, PIs)
<u>Intracortical control of soft robotics for restoration of hand function after stroke</u>
$227,361 (Total site award to Brown, 3 years)
NAMED INVESTIGATOR

2019 - 2021   DoD CDMRP-SCIRP, SC180308 (Ajiboye, PI)
<u>Restoring multi-dimensional reaching and dexterous grasping to persons with chronic tetraplegia through Functional Electrical Stimulation</u>
$72,933 (Total site award to Brown, 2 years)
PRINCIPAL INVESTIGATOR on subcontract to Brown

2018 - 2023   Dept. Veterans Affairs Merit Review Award, A2827-R (Simeral, PI) (NCE)
<u>Deployment of a mobile broadband BCI</u>
$1,200,810 (Total, 4 years)
PRINCIPAL INVESTIGATOR

2018 - 2022   VA Ctr. for Neurorestoration & Neurotech., Seed Grant (Simeral & Paradiso, PIs)
<u>Development and Testing of an Intelligent Visual Prosthesis</u>
$55,402 (Total, 3 years)
CO-PRINCIPAL INVESTIGATOR

2017   VA SHEEP REQUEST (Hochberg, PI - VA)
<u>ShEEP request to upgrade the InMotion upper extremity interactive therapy system</u>
$119,000
NAMED INVESTIGATOR

2017   NIDCD/BRCP ADMINISTRATIVE SUPPLEMENT, (Hochberg & Simeral, Co-PIs - Brown)

Maintaining communication: Implanted brain-computer interfaces for people with ALS
$25,642
CO-INVESTIGATOR

2016 - 2020   NINDS, U01NS098968 (CASH, PI)
Understanding the neural basis of volitional state through continuous neural recordings
$510,132 (total subcontract direct costs, 3 years)
NAMED INVESTIGATOR (SUBCONTRACT TO BROWN)

2015 – 2021   NIH-NINDS, UH2NS095548 (Nurmikko & Hochberg, PIs) [NCE]
High-Bandwidth Wireless Interfaces for Continuous Human Intracortical Recording
$5,784,249 (total, 3 years)
NAMED INVESTIGATOR (SUBCONTRACT TO BROWN)

2015 - 2020   NIH-NIDCD, R01DC014034 (Henderson, PI - Stanford)
Advanced neural decoders for communication interfaces
$203,400 (total subcontract directs, 5 years + NCE)
PRINCIPAL INVESTIGATOR ON SUBCONTRACT TO BROWN

2015 - 2016   Conquer Paralysis Now foundation grant (Simeral, PI - Brown)
Preclinical testing of a high-performance wireless neural interface for individuals with SCI
$50,000 (total, 1 year)
PRINCIPAL INVESTIGATOR

2015   VA Center for Neurorestoration and Neurotechnology, Seed Funding (Simeral, PI)
Haptics integration for neural control of assistive robotic arms by humans with paralysis.
$57,820
PRINCIPAL INVESTIGATOR

2014 - 2018   DEPT. VETERANS AFFAIRS MERIT REVIEW AWARD, P1155R (Simeral, PI)
Mobile signal processing system for broadband neural decoding
$1,058,343 (total, 4 years)
PRINCIPAL INVESTIGATOR

2014 - 2017   NIH-NICHD, R01 HD077220 (Kirsch, PI – Case Western)
Intracortical control of FES-restored arm and hand function in people with SCI
$394,578 (subcontract direct costs, 4 years)
INVESTIGATOR (SUBCONTRACT TO BROWN)

2014 - 2016   General Electric Collaboration GEGR (Donoghue, PI)
Electrode evaluation – phase 1
$112,686 (total)
NAMED INVESTIGATOR

2012   Karen T. Romer Undergraduate Teaching and Research Award
W and F Hewlett Research Collaboration
Alternative methods for state decoding of neural signals
$7500
FACULTY ADVISOR for Brown undergraduate awardee Matteson

2011 - 2016   Dept. of Veterans Affairs, Rehabilitation R&D Service, A6779I (Simeral, PI)
Merit Review Award
Direct intracortical control of a multijoint prosthetic arm

$1,945,112 (total, 5 years)
PRINCIPAL INVESTIGATOR

2011   Karen T. Romer Undergraduate Teaching and Research Award
            W and F Hewlett Research Collaboration
            Computer modeling of intracortical neural signals
            $7,500
            FACULTY ADVISOR for Brown undergraduate awardee Anish Sarma

2009 - 2017 NIH-NIDCD R01 DC009899 (Hochberg, PI - MGH)
            Restoring communication with an intracortical neural interface system
            $369,687 (subcontract direct costs, FY 2016)
            INVESTIGATOR (SUBCONTRACT TO BROWN)

2008 - 2015 Dept. of Veterans Affairs, Rehabilitation R&D Service, B6453R (Hochberg, PI)
            Merit Review Award
            Feasibility of the BrainGate system for Veterans with ALS
            $544,755
            RESEARCH BIOMEDICAL ENGINEER

2008 - 2014 NIH-NCMRR, NICHD, N01 HD53403 (Kirsch, PI)
            Controller development for upper limb movement
            $82,344
            INVESTIGATOR (SUBCONTRACT TO BROWN)

2003 - 2005 NIMH Postdoctoral Research Fellowship, T32 MH19118
            Brown University
            POST-DOCTORAL FELLOW

1997 - 2000 NIMH pre-doctoral Individual NRSA, F31 MH11989
            Wake Forest University Graduate School of Arts and Sciences
            Nonlinear systems analysis of hippocampal neuronal ensembles.
            $82,344
            PRE-DOCTORAL FELLOW

1996 - 1997 Graduate Training Fellowship
            Wake Forest University Graduate School of Arts and Sciences
            $72,000
            GRADUATE FELLOW

Honors and Awards

Patents / patent applications

1990   Sanwo IJ, **Simeral JD**, Daniel RA. *ECL-to-CMOS Converter*. USA #4,888,501.

1992   Sanwo IJ, **Simeral JD**, Daniel RA.*ECL-to-CMOS Converter*. Canada #1,304,459.

2015   Nurmikko AV, Heelan CD, Borton DA, Komar J, Rosler D, **Simeral JD**. *System and Methods for Mobile Medical Monitoring*. US2015/025595.

2021.11.01 Hochberg LR, **Simeral JD**, Hosman T, Singer-Clark T, Gross R, Kapitonava A. *Brain computer interface (BCI) system that can be implemented on multiple devices.* United States Patent 11972050. *[issued 2024.04.30]*

2022.12.06 **Simeral JD**, Hosman T, Vargas-Irwin C, Thengone D, Hochberg LR, Singer-Clark T. *Providing mental control of position and/or gesture controlled technologies via intended postures.* United States Patent Application #18/075,811. Priority date 12/6/2021. *[pending]*

2023.11.13	Hochberg LR, Hosman T, Gusman J, **Simeral JD**, Vargas-Irwin C. *Brain machine interface for performing sustained actions.* United States Patent Application #18/946,156. Priority date 11/13/23. Filed 11/13/24. *[pending]*
2024.11.14	Hochberg LR, Lütsch Espinosa SE, Hosman T, Rosler D, **Simeral JD**, Vargas-Irwin C, Herrick N. *High accuracy selection of elements of groups using a brain machine interface (BMI).* United States Patent Application #18/947,556. Priority date 11/14/2023. Filed 11/14/24. *[pending]*

Research

2008	**Highlights of 2008 Collection** awarded by Journal of Neural Engineering "Neural control of computer cursor velocity by decoding motor cortical spiking activity in humans with tetraplegia," Kim S-P, Simeral JD, Hochberg LR, Donoghue JP and Black MJ. J. Neural Eng. 5(4):455-476, Dec 2008.
2011	Senior Membership of the IEEE awarded.
2011	**Most cited paper for 2010-2011 (top 10)**. Journal of Neural Engineering, for Simeral et al. (2011) "Neural control of cursor trajectory and click by a human with tetraplegia 1000 days after implant of an intracortical microelectrode array". Journal impact factor of 3.837, ranked 5th of 72 biomedical engineering journals on ISI.
2011	**Highlights of 2011 Collection** awarded by Journal of Neural Engineering for Simeral et al. (2011) publication "Neural control of cursor trajectory and click by a human with tetraplegia 1000 days after implant of an intracortical microelectrode array", based on 'the highest praise from our international referees and the highest number of downloads.'
2012	**Finalist, Annual g-tec BCI Award 2012** for "Intracortical control of assistive devices by individuals with tetraplegia."
2012	**Herbert Pardes Clinical Research Excellence Award, 2012**, by Massachusetts General Hospital for "Reach and grasp by people with tetraplegia using a neurally-controlled robotic arm." Nature, 2012, for most outstanding clinical research achievement of 2012.
2012	**Most cited papers for 2011-2012 (top 10)**. Journal of Neural Engineering, for Simeral et al. (2011) "Neural control of cursor trajectory and click by a human with tetraplegia 1000 days after implant of an intracortical microelectrode array". Journal impact factor of 3.837, ranked 5th of 72 biomedical engineering journals on ISI.
2012	**Martin Research Prize for Excellence in Basic Research, 2012**, by Massachusetts General Hospital for "Reach and grasp by people with tetraplegia using a neurally-controlled robotic arm," Nature, 2012.
2013	**Israel Brain Technologies B.R.A.I.N. prize** international competition. Co-awardee with D. Rosler, A. Nurmikko, J. Donoghue and L. Hochberg. $1,000,000.
2014	**Business Insider** online video story covering BrainGate research (interview)
2018	**The Economist** online video story covering BrainGate research (filmed interview)
2018	**1st Prize, Annual BCI Society Award 2018** for "Restoring functional reach-to-grasp in a person with chronic tetraplegia using implanted functional electrical stimulation and intracortical brain-computer interfaces." (awarded with co-authors).

2024   **Top 3 finalist, Brown University Innovation of the Year**, for "Virtual Keyboard for Use with an Intracortical Brain-Computer Interface" (with co-patent applicants)

2024   **Sean M. Healey International Prize for Innovation in ALS.** "Celebrating excellence in research for a team of investigators who catalyze exceptional discoveries leading to a transformative advance in therapy development in ALS." One of 12 Principal Investigators in the BrainGate Consortium receiving this award. Presented at the 35th International Symposium on ALS/MND in Montreal, Quebec.

Service to the Profession

Executive Leadership
 2015-*pres*   Executive Council Member, VA Center for Neurorestoration and Neurotechnology
 2015-*pres*   Focus Area Leader, Focus Area on Restoring Communication and Mobility, VA Center for Neurorestoration and Neurotechnology, Providence, RI

Society Service & Conference Organization
 2006   Founding member, IEEE EMBS, Providence Chapter
 2011   Session Organizer and Co-Chair, Neural Engineering Track, BMES Annual Meeting, Hartford, CT, Biomedical Engineering Society, 2011.
 2015   Founding member, international BCI Society, Netherlands
 2016   Workshop Chair and Organizer, 6th Int'l BCI Meeting, Asilomar / Pacific Grove, CA
            "Pathways to effective BCI communication and computer interaction for people with disability"
 2019   Invited participant, NIH Conference: SCI 2020: Launching a Decade for Disruption in Spinal Cord Injury Research (co-sponsored by NINDS, NCMRR, NICHD), Rockville, MD, Feb 12-13, 2019.
 2023   Workshop Planning Committee, 9th Int'l BCI Meeting, Brussels, Belgium. June 6-9, 2023.
            "Technological development and implementation of BCIs for home use"
 2025   Panelist, "Workshop on Defining the Role of Computing Research in Neural Interfacing". Washington, DC. April 22-23, 2025.

Standards Development / Regulatory
 2016   Participant in NIH Workshop on Standards and Modularity of Brain-Computer Interfaces and Neuroprostheses
 2017   Educator, FDA Experiential Learning Program, FDA field trip to BrainGate trial

Reviewer (grants)
 Previous   Natural Sciences and Engineering Research Council of Canada (NSERC)
            American Institute of Biological Sciences
            US Army Medical Research and Materiel Command (USAMRMC)
            Lifespan
            Wellcome Trust
            American Institute of Biological Sciences (AIBS)
            NINDS: Special Emphasis Panel, "NINDS Exploratory Clinical Trials (R01)"
 2020-   Natural Sciences and Engineering Research Council of Canada (NSERC), Veterans Administration Technology Transfer BRAVE Award Program

Reviewer (journal manuscripts)
 Previous: Science Translational Medicine
            Journal of Neural Engineering

Neural Information Processing Systems (NIPS)
Neuron
Annals of Neurology
Neurocomputing Review
2020-   Frontiers in Neuroscience
Neurobiology of Disease
Journal of Neuroscience Methods
IEEE Transactions on Biomedical Circuits and Systems
Neurorehabilitation and Neural Repair

Reviewer (conference abstracts)
Biomedical Engineering Society (BMES)
BCI Society

Society Memberships
1988-2007 Member, IEEE
1999-2010 American Association for the Advancement of Science, member (AAAS)
2007-2012 Biomedical Engineering Society, member (BMES)
1996-*pres* Member, Society for Neuroscience (SfN)
1996-*pres* Engineering in Medicine and Biology Society, member (IEEE EMBS)
2007-*pres* Senior Member, IEEE
2015-*pres* Founding Member, BCI Society, Netherlands

Service to the University

2012   Speaker, Alumni Networking & Recruiting Event, School of Engineering, Brown University, Providence, RI

2014   Exhibit organizer, Brown University 250th Anniversary Research Day (Interactive public Robotics exhibit at Sydney Frank Hall)

2023   Exhibit organizer, Brain Fair, Brown University (Interactive Brain-computer interface exhibit, ERC)

2025-   Member, BME master's program Advisory Board

2025-   Application Reviewer, BME master's program

Service to the Community

2009   Keynote speaker, North Country Access Disabled Sports USA, Clayton, NY

2012   Invited speaker, Everett Company, Granoff Center for the Creative Arts, Providence, RI

2014   Television and radio community service programs and community outreach spotlighting BrainGate research (associated with keynote talk at Spinal Cord Injury Network, Sydney, Australia:
- ABC News 24 TV, "Morning News" with Andrew Geoghegan and Eliza Harvey
- Radio 2BG 873 AM, "Life and Technology" with Warren Moore
- Radio 2UE, "Healthy Living" with Dr. Ross Walker

2014   Keynote speaker, Spinal Cord Injury Network, Sydney, Australia.

2016   Keynote speaker, 22nd Annual Brain Injury Symposium, Baptist Hospital Rehabilitation Center, Miami, FL

2017	Panelist, "Advances and Future Outlook in Neuroscience"
	Rhode Island MedMates Life Sciences Expo 2017, Providence, RI
2017	Keynote Speaker, 28th International Symposium on ALS/MND
	"The innovation landscape in ALS/MND: Beyond Pharmacotherapies"
	Westin Waterfront Hotel, Boston, MA
2018	Lecturer, 2018 Translational Neuroscience and Neural Engineering Workshop
	Salve Regina University, Newport, RI
2019	Live radio Skype interview for BBC World News TV story, "Paralysis of Thought"
	for BBC's Asia-facing news service (BBC Singapore)

Student Advising – Brown University

Undergraduate Advising

2005	Aaron Glieberman, Division of Engineering
	Undergraduate summer research, Brown University
	Co-Mentor (with LR Hochberg)
2009	Jacob Donoghue, Dept. of Neuroscience
	Assistant Mentor for Senior Honors Thesis
2010-2012	Anish Sarma, School of Engineering
	Faculty mentor, Junior year EE research project
	Advisor, UTRA award for undergraduate training
	Thesis Advisor, Senior Research Thesis:
	"Simulation and extraction of control-signal features from field potential oscillations in human motor cortex."
2012-2014	Evan Matteson, School of Engineering
	Undergraduate Research advisor
2013	Advisor, UTRA award for undergraduate training
	"Exploration of alternative methods for state decoding of neural signal
2013	Advisor, Independent Study (Engn 1970):
	"A method of inferring intended position and velocity from closed-loop data for calibration of an intracortical brain computer interface."
2012-2014	James Besancon, School of Engineering
	Thesis advisor, Senior Honors Thesis in Engineering:
	"Kinematic structures for the DEKA arm: A framework for shared control."
2014-2015	Daniel Milstein, School of Engineering
	Faculty mentor & Reader (with Erik Sudderth), Senior Research Thesis:
	"Assumed density filtering for neural decoding."
2017-2018	Alexander Lo, Biomedical Engineering
	Thesis advisor, Senior Honors Thesis in Biomedical Engineering:
	"Longitudinal analysis of neural units as recorded by a multielectrode array."
2018-2019	Zoe Beckman, Biomedical Engineering
	Undergraduate research advisor, Sophomore
	"Analysis of human cortical neuronal activity tracked over months and years."
2018-2019	Annabelle Iserson, Biological Sciences
	Thesis advisor, Senior Honors Thesis in Health & Human Biology (AB):

"Developing methods to deploy and assess BCI technology for individuals with paralysis in their homes."

2019   Pablo Soler-Portilla, Electrical Engineering
ADVISOR, junior-year Independent Study in Engineering:
     "iBCI using embedded hardware"

2019   Alexander Reuter, School of Engineering
MENTOR, summer internship (rising sophomore):
     "Configuring Zynq embedded systems for real-time BCI"

2022   Christopher Schiff, School of Engineering
MENTOR, summer internship (rising senior):
     "Translating Simulink models to FPGA logic for embedded BCI processing"

2023 - 2025   Natalie Herrick, School of Engineering (BME)
MENTOR, undergraduate research ('23 – '25)
MENTOR, UTRA award for undergraduate training (summer '23 , rising junior):
     "Deploying experiments for onscreen 10-digit BCI typing with tetraplegia"
ADVISOR, Engineering Independent Study (ENGN 1970, fall '24)
     "Assistive virtual typing using mixed gesture decoding in an intracortical BCI"

2024   Damir Kulzhanov, Physics & Computer Engineering
ADVISOR, summer SPRINT (rising senior)
     "C programming for a Linux ARM processor for the BrainGate BCI"
ADVISOR, INDEPENDENT STUDY / SENIOR CAPSTONE (ENGN 1972):
     "Software for an embedded Bluetooth system for mobile assistive BCI"

2025   Sarah Richman, Applied Math & Computer Science
ADVISOR, INDEPENDENT STUDY (ENGN 1971, S11):
     "ARM real-time data streaming in a an embedded hybrid SoC"

Graduate Student Advising (Sc.M.)

2014 - 2015   James Besancon, Engineering
THESIS ADVISOR (5TH year ScM)
     "Using virtual robot experimentation platform (V-REP) to enable shared control of a robotic arm via brain-computer interface"
     (Project Engineer, Bloomy, industrial automation, Windsor, CT)

2014 - 2016   Jose Albites Sanabria, Biomedical Engineering
MENTOR & THESIS COMMITTEE MEMBER (ScM) (Advisor: Leigh Hochberg)
     "BrainGate-enabled intracortical neural control of commercial tablet computers by individuals with tetraplegia."
(Founding Partner and Manager, Lima Bionics. Peru, 2016)
(Professor, National University of Engineering, Lima, Peru 2018)

2015 - 2017   Johnny Ciancibello, Biomedical Engineering
THESIS advisor (ScM)
     "Improving real-time classification methods for an intracortical brain-computer interface in humans"
(The Feinstein Institute for Medical Research: Center for Bioelectronic Medicine)
(Account manager, home medical supplier Sentido Health, Denver, CO)

2016 - 2017   Daniel Milstein, Computer Science
THESIS PROJECT MENTOR, THESIS COMMITTEE MEMBER (ScM) (Adv: Erik Sudderth)
     "Assumed density filtering for neural decoding"
(Software programmer, Harvard Med. Sch.; graduate student, UMass Amherst C.S.)

2018 - 2019   Shirin Tooloee, Biomedical Engineering
THESIS ADVISOR (5th year ScM)
"Understanding How Cognitive Deficits Influence Motor Recovery in Patients with Acute Ischemic Stroke"
(Clinical engineer for Robotics Solutions, Johnson & Johnson)

2022 - 2024   Stefan Lütschg Espinosa, Biomedical Engineering
THESIS ADVISOR (ScM)
"Development of a 10-digit BCI neural typing interface for people with tetraplegia"

2023 - 2024   Yuan Cao, Electrical and Computer Engineering
RESEARCH ADVISOR (ScM)
"Developing real-time data streams for an ARM embedded BCI system"
(Notre Dame PhD program in Electrical Engineering, starting fall 2024)

2023 - 2025   Qiwu Zhang, Electrical and Computer Engineering
THESIS ADVISOR (ScM, *in progress*)
"Design and synthesis of FPGA logic for embedded BCI neural signal processing"

2024 - 2025   Zeming Liu, Biomedical Engineering
THESIS READER (ScM) (advisor Wilson Truccolo)
"Parameter optimization for noninvasively-induced electric fields in pediatric tDCS"

2024 -   Claire Nicolas, Biomedical Engineering
THESIS ADVISOR (ScM, *in progress*)
User-Centered Design Project, in progress

2024 -   Yishu Li, Biomedical Engineering
THESIS ADVISOR (ScM, *in progress*)
"Leveraging stable neural manifolds for high-performance multi-gesture BCI decoding" (planning stage)

Graduate Student Advising (Ph.D.)

2013 - 2018   Chris Heelan, Electrical Engineering
THESIS CO-ADVISOR (PhD) (with Arto Nurmikko)
"Mobile electronics for medical prosthetic applications."
(Machine learning lead at investments company GMO, Boston, MA)

2022 - 2024   Mona Khoshnevis, Applied Math
THESIS READER (PhD) (advisor Matt Harrison)

Technical Staff Trainees

2007-2009	Katherine Centrella Newell	Clinical Neurotechnology Research Asst., BrainGate project (Emory School of Medicine, MD) Emergency Medicine Physician, Pinehurst, NC
2007-2010	Sergey Stavisky	Software/Hardware Engineer, BrainGate project (Stanford PhD program in Eng; now faculty at UC Davis)
2009-2012	Erin Gallivan Oakley	Clinical Neurotechnology Research Asst., BrainGate project (USC Keck School of Medicine, MD) (Emergency Medicine Resident, Boston Medical Center)
2009-2014	Dan Bacher	Software/Hardware Engineer, BrainGate project (Ximedica, medical device consulting) (Founder, Speak Your Mind Foundation)

		(VP of R&D, Celero Systems)
2010-2011	Etsub Berhanu	Neurotechnology Research Asst., BrainGate project (US Patent Office)
2011-2014	Nick Schmansky	Mass. Gen. Hosp. Software Engineer, BrainGate project (Continued at MGH: PI for software commercialization SBIR)
2012-2013	Kathryn Tringale	Clinical Neurotechnology Research Asst., BrainGate project (UCSD School of Medicine, MD, then Radiation Oncology Res., Mem. Sloan Kettering Cancer Ctr)
2012-2015	Anish Sarma	Software/Hardware Engineer, BrainGate project (Cal Tech PhD program in Comp. & Neural Sys)
2012-2014	Brittany Sorice	Clinical Neurotechnology Research Asst., BrainGate project (Speech & Language Pathology program at B.U.)
2013-2015	James Besancon	Engineering summer intern (2013), BrainGate (Project Engineer, Bloomy, industrial automation)
2013-2018	Jad Saab	Systems Engineer, BrainGate project (Insight Data Science, New York City)
2016-2020	Jessica Kelemen	Clinical Neurotechnology Research Asst., BrainGate project (MIT Sloan School of Management)
2017-2018	Benjamin Shanahan	Software Engineer, BrainGate project (Software Engineer, NeuroPace (2018-'20); SpaceX ('20+))
2017-2018	Jannis Brea	User Experience UX Designer, BrainGate project (MD program, Feinberg School of Medicine, Northwestern)
2019-2022	Tyler Singer-Clark	Software Engineer, BrainGate project (U.C. Davis Neuroscience PhD program, 2022+)
2015-2023	Tommy Hosman	Systems Engineer, BrainGate project (Combined Berkeley-UCSF graduate program)
2020-2024	Ronnie Gross	UI/UX Design Engineer, BrainGate project [Georgia Inst. Tech. Masters Program in Computer Science]
2021-2023	Rekha Crawford	Research Engineer, BrainGate project ADVISOR, Brown PREP program, 2022-2023 (accepted, Emory PhD program in neuroengineering)
2022-	Shane Allcroft	Systems Engineer, BrainGate project
2024-	Andrew Dempsey	Systems Engineer, BrainGate project

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[116] Gross-Lewis R, Crawford R, Singer-Clark T, Hosman T, Kapitonava A, Nicolas C, **Simeral JD**, Hochberg LR. Engaging a person with tetraplegia in the user-centered design of an at-home intracortical BCI system. *Northeast ALS Consortium (NEALS) 22nd Annual Meeting*, Key West, FL. October 2-4, 2023. Northeast ALS Consortium, 2023.

[117] **Simeral JD**, Hosman T, Nurmikko AV, Rosler DM, Hochberg LR. A second-generation battery-powered embedded processing system for large scale broadband intracortical BCI. Program No. 488.11. 2023 Neuroscience Meeting Planner. Washington, DC: *Society for Neuroscience*, 2023. Online.

[118] Lütschg Espinosa SE, Hosman T, Nicolas C, Allcroft S, Herrick N, Hochberg LR, Vargas-Irwin CE, **Simeral JD**. Toward assistive communication using a discrete ten-digit single hemisphere intracortical brain computer interface. Program No. 488.01. 2023 Neuroscience Meeting Planner. Washington, DC: *Society for Neuroscience*, 2023. Online.

[119] Gusman JT, De Lucena DS, Hosman T, Nicolas C, Kapitonava A, Wagner DA, Hahn N, Henderson JM, **Simeral JD**, Vargas-Irwin CE, Walsh CJ, Hochberg LR. Using intracortical BCI decoding in human motor cortex for restoring natural control of sustained hand grips with a soft robotic glove. Program No. 488.03. 2023 Neuroscience Meeting Planner. Washington, DC: *Society for Neuroscience*, 2023. Online.

[120] Lütschg Espinosa SE, Hosman T, Nicolas C, Jude J, Allcroft S, Herrick N, Hochberg LR, Vargas-Irwin CE, **Simeral JD**. Toward assistive communication using a discrete mixed-gesture single-hemisphere intracortical brain-computer interface. *National VA Research Week*, *Providence VA Medical Center*, Providence, RI. May 16, 2024.

[121] Gusman J, de Lucena D, Hosman T, Rao K, Nicolas C, Kapitonava A, Acosta A, Wagner D, Hahn N, Rubin DB, Henderson JM, **Simeral JD**, Vargas-Irwin CE, Walsh CJ, Hochberg LR. Human intracortical brain-computer interface control of a soft robotic glove. Program No. nano48.01. 2024 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[122] Hahn NV, Stein E, **Simeral JD**, Hochberg LR, Henderson JM, Willett FR. Long term performance of intracortical microelectrode arrays for cursor control in 14 BrainGate participants. Program No. pstr030.14. 2024 Neuroscience Meeting Planner. Program No. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[123] Levi-Aharoni H, Jude J, Allcroft S, Acosta A. Haro S, **Simeral JD**, Hochberg L, Rubin DB. Hierarchical representations of language in human cortex at the single neuron level. Program No. pstr030.09. 2024 Neuroscience Meeting Planner. Program No. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[124] Haro S, Jude JJ, Acosta AJ, Levi-Aharoni, H, Allcroft S, Card NS, Wairagkar M, Brandman DM, Stavisky SD, **Simeral JD**, Hochberg LR, Rubin DB. Tailoring the Use of a Chronically-Implanted Intracortical Speech Neuroprosthesis for a Person With Long-Standing Anarthria. Program No. pstr030.15. 2024 Neuroscience Meeting Planner. Program No. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[125] Jude J, Allcroft S, Acosta A, Card N, Wairagkar M, Stavisky SD, Brandman D, **Simeral JD**, Hochberg L, Rubin D. An intuitive, bimanual, thirty-way, high-throughput sequence to sequence QWERTY keyboard typing neuroprosthesis. Program No. pstr030.22. 2024 Neuroscience Meeting Planner. Program No. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[126] Jude J, Haro S, Levi-Aharoni H, Acosta A, Allcroft S, Card N, Wairagkar M, Brandman D, Stavisky SD, **Simeral JD**, Hochberg LR, Rubin DB. A large vocabulary intracortical speech neuroprosthesis for a locked-in person with anarthria. Program No. pstr030.20. 2024 Neuroscience Meeting Planner. Program No. Chicago, IL: *Society for Neuroscience*, 2024. Online.

[127] Herrick NC, Lütschg Espinosa SE, Hosman T, Nicolas C, Acosta A, Allcroft S, Vargas-Irwin CE, Hochberg LR, **Simeral JD**. Assistive virtual typing using mixed gesture decoding in a single-hemisphere intracortical brain-computer interface. Program No. PSTR030.23. 2024 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2024. Online.

Lectures and Presentations

National / International Invited & Keynote Lectures

"Architecture of the AT&T WorldMark Massively Parallel Computer System"
International NCR ASIC TIES Developers Conference
Breckenridge, CO
June 22, 1991 (Invited lecture).

"Toward neural control of assistive technologies for individuals with motor disability"
North Country Access Disabled Sports USA
Clayton, NY
July 19, 2008 (Keynote speaker).

"Intracortical neural interfaces for the restoration of communication and mobility"
Frontiers in Neuroengineering Monte Verita Conference
Locarno, Switzerland
September 8, 2010 (Keynote speaker).

"From a spike-centered brain universe to its underlying synaptic landscape: future technologies for brain reverse engineering and neuroprosthetics"

The European Future Technologies Conference and Exhibition FET11
Budapest, Hungary
May 5, 2011 (Symposium speaker)

"Engineering, neuroscience, and clinical evaluation of the BrainGate Neural Interface System."
Neuroengineering Symposium, Beckman Institute
Urbana-Champaign, IL
June 16, 2011 (Invited lecture).

"BrainGate and the future of brain-computer interface technology."
The Spinal Cord Injury Network Connections 2014 Conference
Sydney, Australia
Oct 13, 2014 (Keynote speaker).

"How could brain-computer interfaces enable reliable, potent assistive technology?"
Assistive Technology Industry Association (ATIF) Conference
Orlando, FL
February 4, 2016 (Platform lecture, CME Education Session)

"Effective BCI: Different approaches, common clinical purpose"
6th International BCI Society Meeting
Pacific Grove, CA
June 2, 2016 (Workshop organizer)

"Intracortical brain-machine interfaces: Experience from pilot clinical trials"
22nd Annual Brain Injury Symposium, Baptist Health South Florida
Miami, FL
October 15, 2016 (Keynote speaker)

"Recent advances in neural engineering for individuals with ALS/MND"
28th Annual International Symposium on ALS/MND, Westin Hotel
Beyond Pharmacotherapies; The innovation landscape in ALS
Boston, MA
Dec 9, 2017 (Keynote speaker)

"Hybrid FPGA-ARM processing for neural signal processing and decoding"
Computing Community Consortium Workshop on Defining the Role of Computing Research in Neural Interfacing
Washington, DC
April 22-23, 2025 (Workshop panelist and speaker)

Other National Meeting Presentations

"Ensemble spiking activity as a source of cortical control signals in individuals with tetraplegia"
Biomedical Engineering Society Annual Meeting
Los Angeles, CA.
September 27, 2007 (Platform lecture).

"Toward neural control of assistive technologies for individuals with motor disability"
ONR Workshop on Biorobotics and Human Interaction
Arlington, VA.
June 2, 2008.

"Advances in mobile wireless signal processing toward intracortical BCI deployment"
Nanosymposium on Peripheral Neural Interfaces for Reach and Grasp

Society for Neuroscience Annual Meeting
Washington, DC.
November 15, 2017 (Microsymposium lecture).

"Evolution of a real-time system for intracortical BCI: from NHPs to living room"
Translational Neuroscience and Neuroengineering Summer Workshop, Salve
Regina University
Newport, RI
June 8, 2018 (Workshop instructor / lecturer)

Regional /Local Lectures

"Toward neural control of assistive technologies for individuals with motor disability."
Dept. Neuroscience, Brown University, Providence, RI
October 14, 2008.

"BrainGate2: Toward Neural Control of Assistive Technologies for Individuals with Motor Disability."
VA Medical Center, Providence, RI
March 18, 2009

"Progress in the pilot clinical trial of the BrainGate intracortical neural interface system."
VA Medical Center, Providence, RI
December 15, 2010 (Invited lecture)

"Developing the BrainGate2 neural interface system across institutional boundaries."
Brown University Research Day, Providence, RI
August 27, 2010 (Invited lecture)

"Developing neural interface technology and assistive solutions for individuals with tetraplegia and locked-in syndrome."
IEEE Engineering in Medicine and Biology Society, Providence Chapter
March 22, 2011 (Invited lecture)

"Engineering the BrainGate neural interface system at Brown."
Engineering Alumni Networking and Recruiting Event, Brown Univ, Providence, RI
February 4, 2012 (Invited lecture)

"Toward neurotechnologies for people with paralysis, locked-in syndrome or upper limb loss."
Everett Theater Company, Granoff Center for the Creative Arts. Brain Café.
Providence RI
December 10, 2012 (Invited lecture)

"Rapid and flexible data investigation in the BrainGate pilot clinical trial."
Institute for Computational and Experimental Research in Mathematics, Brown
University, Providence RI
May 18, 2012 (Invited lecture)

"Human-robot interaction: BrainGate2 for people with motor disability or upper limb loss"
Symposium on Human Robot Interaction, Brown University, Providence RI.
December 10, 2012 (Invited lecture)

"Neural engineering for brain-computer interface neurotechnology"
Neural Engineering guest lecture, University of Rhode Island, Kingston RI.
March 12, 2015 (Invited lecture)

"Brain-machine prostheses: independence for individuals with paralysis or amputation"
>   Prosthetics Industrial Design, Rhode Island Sch. of Design (RISD), Providence, RI
>   April 6, 2016 (Invited lecture).

"Developing a high-performance intracortical BCI for individuals with tetraplegia"
>   Engineering Graduate Student Seminar Series, University of Rhode Island,
>   Kingston RI.
>   October 19, 2016 (Invited lecture).

"Advances and future outlook in neuroscience: multi-site BrainGate BCI research"
>   Panel presentation, MedMates forum on neuroscience economic opportunities,
>   Providence RI.
>   April 26, 2017 (Invited panel lecture).

"An intracortical brain-computer interface – a look behind the technology curtain."
>   VA Medical Center, Providence, RI
>   May 15, 2020 (Invited lecture)

"Elements of an intracortical BCI for home use by individuals with tetraplegia."
>   MGH-Brown T32 Neurorecovery Seminar Series.
>   May 17, 2022 (Invited lecture, virtual)

"Virtual keyboard for use with an intracortical Brain-Computer Interface (BCI)",
>   Brown University Innovations@Brown ShowCase
>   September 26, 2024

Microelectronics Devices Created

2014-   Mobile Signal Processor for Medical & iBCI applications
>   A small-form, battery-powered hybrid embedded system processor for real-time
>   neural signal processing and decoding. Developed through VA Merit-funded
>   research for use in the BrainGate Neural Interface System pilot clinical trial and
>   beyond. *In development.*

2016-   Small Single-Frequency Broadband Receiver for Mobile iBCI Applications
>   A small-form, battery-powered single-band microwave receiver optimized for
>   wheelchair deployment of a wireless mobile intracortical BCI. *In development.*

2020-   Mobile Dual-Band Wireless Receiver for iBCI Applications
>   A small-form, battery-powered dual-band microwave RF receiver developed
>   through VA Merit-funded research for deployment in the BrainGate pilot clinical
>   trial. A robust redesign of a laboratory prototype from the Nurmikko lab. *In
>   development.*