Faculty of Medicine of Harvard University
Curriculum Vitae

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Education

05/2003	BA *(magna cum laude)*	Biology and Biomedical Physics	Washington University in St. Louis
06/2011	MD	Medicine	Washington University in St. Louis School of Medicine
06/2011	PhD	Biology and Biomedical Sciences, Neurosciences (PI: Steven Petersen PhD)	Washington University in St. Louis School of Medicine

Postdoctoral Training

07/11 - 06/13	Resident	Pediatric and Adolescent Medicine	Mayo Clinic Rochester
07/13 - 06/16	Resident	Child and Adolescent Neurology	Mayo Clinic Rochester
07/16 - 06/18	Clinical Fellow	Pediatric Behavioral Neurology	Boston Children's Hospital
07/17 - 06/19	Postdoctoral Fellow	T32 Translational Postdoctoral Training in Neurodevelopment (PI: Michael Fox, MD PhD)	Boston Children's Hospital and Beth Israel Deaconess Medical Center

Faculty Academic Appointments

07/15 - 06/16	Instructor	Neurology	Mayo Clinic, Rochester MN
07/18 - 11/21	Instructor	Neurology	Harvard Medical School
12/21 - Present	Assistant Professor	Neurology	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

Current

07/18 - Present	Assistant	Neurology	Boston Children's Hospital

Major Administrative Leadership Positions

<u>Local</u>

2021 - Present	Director, Data Organization Collaborative Service (DoCS), Rosamund Stone Zander Translational Neuroscience Center	Boston Children's Hospital

Committee Service

<u>Local</u>

2012 - 2013	Pediatrics Inpatient RN/MD Communication Committee	Mayo Clinic, Rochester MN
	2012 - 2013	Physician Member
2018 - Present	IRB Scientific Review	Boston Children's Hospital
	2018 - Present	Scientific Reviewer
2019 - Present	Research Imaging Advisory Committee	Boston Children's Hospital
	2019 - Present	Member, Neurology Representative
2019 - 2021	Brookline Place Transformer Teams	Boston Children's Hospital
	2019 - 2021	Member, Autism Spectrum Center Team
	2019 - 2021	Member, Behavioral Neurology Team
	2019 - 2021	Member, Research MRI Team
2021 - Present	Autism Spectrum Center Research Committee	Boston Children's Hospital

Professional Societies

2000 - 2016	Sigma Xi Scientific Research Society	
2003 - Present	American Medical Association (AMA)	
2004 - 2011	Society for Neuroscience	
2011 - 2013	American Academy of Pediatrics (AAP)	
2013 - Present	American Academy of Neurology	
	2013 - Present	Child Neurology Section Member
	2013 - Present	Neuroimaging Section Member
2013 - Present	Child Neurology Society	
	2016 - 2018	Member, Scientific Selection and Program Planning Committee
	2019 - 2021	Member, Scientific Selection and Program Planning Committee

	2021 - Present	CNS Representative, International Collaboration of the Young Representatives (spanning 5 international Child Neurology Societies: CNS, ACNA, AOCNA, EPNS and ICNA)
2016 - Present	American Society of Neuroimaging	
2017 - Present	Organization for Human Brain Mapping	
2019 - Present	American Neurological Association	
2019 - Present	Flux: The Society for Developmental Cognitive Neuroscience	
2019 - Present	International Child Neurology Association	
2020 - Present	International Society for Autism Research	

Editorial Activities

Ad hoc Reviewer

Cerebral Cortex

Child Neurology Open

Developmental Science

Human Brain Mapping

IEEE Journal of Biomedical and Health Informatics

Journal of Autism and Developmental Disorders

Journal of Child Neurology

Journal of Neuroscience Methods

Nature Human Behavior

NeuroImage

Neuropediatrics

PLoS Computational Biology

PLoS ONE

Proceedings of the National Academy of Sciences

Honors and Prizes

2000 - 2002	Dean's List	Washington University in St. Louis	Academic achievement
2001	Summer Research Fellowship	Howard Hughes Medical Institute	Research
2006 - 2008	Integrative Graduate Education and Research Training (IGERT) Program Fellowship	Washington University in St. Louis	NSF 0548890 Cognitive Computational and Systems Neuroscience
2007	Travel Award	NSF--Institute for Pure Applied Mathematics (IPAM)	Conference on Image Processing for Random Shapes, Applications to Brain Mapping, Geophysics, and Astrophysics
2008 - 2009	Graduate Student Finalist, James L. O'Leary Prize Competition	Washington University in St. Louis	For Outstanding Research in Neuroscience
2009	Winning Entry in the Pittsburgh Brain Connectivity Competition	Organization for Human Brain Mapping	Awarded at the 15th Annual Meeting of the OHBM
2016	Chief Resident Award	Mayo Clinic, Rochester MN	Teaching
2017 - 2019	Translational Post-doctoral Training in Neurodevelopment (T32) Fellowship	Boston Children's Hospital	Research
2019	Workshop on Autism Spectrum Disorders	Cold Spring Harbor Laboratory	Research
2020	Harvard Grant Review and Support Program	Harvard Catalyst	The Harvard Clinical and Translational Science Center	Research
2021	HMS/HSDM Leadership Development Course for Physicians and Scientists	Harvard Medical School	Leadership

Report of Funded and Unfunded Projects

Grants and Sponsored Research

Past

2008 - 2011   Defining Human Cortical Functional Areas Using Resting Functional Connectivity
NINDS, F30 NS062489 (Ruth L. Kirschstein NRSA Individual Fellowship for
MD/PhD Students)
Awardee
The goal of the study was to identify the possibility of using resting state functional
connectivity MRI to define distinct regions/functional areas across the brain.

Current

2020 - 2021   Using clinical cohorts and functional connectivity to identify the neuroanatomical
basis of atypical face processing in autism spectrum disorders
Child Neurology Society/Foundation PERF Shields Research Grant
PI, Direct Costs: $100,000
The goal of this project is to determine whether the pattern of cortical tubers in
children with Tuberous Sclerosis Complex and/or a specific predicted network
abnormality predicts their face processing ability.

2020 - 2024   The neuroanatomical basis for face processing deficits in autism spectrum disorder
NIH, K23 MH120510
PI, Direct Costs: $722,238
This proposal investigates the cause of face processing difficulties in ASD by
leveraging information from patients with acquired prosopagnosia and prospective
collection of MRI and behavioral data in adolescent subjects across a range of face-
processing abilities.

2020 - 2023   Identifying the common neural substrate critical for face processing deficits
NIH/NINDS/KKI Child Neurology Career Development Program, Parent training
grant 1K12NS098482 (Funding declined upon receiving K23 grant)
PI
The goal of this project is to determine whether 1) the pattern of cortical tubers in
children with Tuberous Sclerosis Complex, and 2) functional connectivity
abnormalities in adolescents with idiopathic Autism Spectrum Disorder converge on
common network alterations that predict their face processing ability.

2021 -   Using Network Mapping to Identify Neuromodulation Targets for Agitation and
Present   Aggression in Autism Spectrum Disorder
Simons Foundation Autism Research Initiative / Bridge to Independence Award
PI, Direct Costs: $396,000
Starting date to be determined within 2 years. The goal of this project is to identify a
brain circuit where injury or developmental alteration is associated with agitation and
aggression across age and clinical population. This will localize a potential
mechanism as well as a putative treatment target for non-invasive neuromodulation.

Training Grants and Mentored Trainee Grants

2021   Dean's Research Fellowship: Alyssa Edwards, MPH (Active)
Case Western Reserve School of Medicine
Mentor
Summer research stipend awarded to Alyssa Edwards, MPH.

2022 - 2025   CH/BIDMC/Harvard Medical School Neurology Resident Research Education
               Program (Active)
               NINDS, NIH, 5R25NS070682
               Mentor of Wendy Herman
               R25 awarded to Wendy Herman, MD.

Current Unfunded Projects

2016 - Present
Assessing the Utility of Clinical MRIs in Newly Diagnosed ASD Patients
Co-PI
With Simon K. Warfield PhD, I am retrospectively studying the cohort of Autism patients seen at BCH over the past 16 years to determine clinical efficacy trends and creating a large-scale imaging database of clinical structural MRIs in ASD.

2017 - Present
Improvement of motion correction strategies for functional neuroimaging in pediatric clinical populations
Collaborator
Working with research fellows in the Computational Radiology Laboratory, this project seeks to expand on a novel method, Dynamic Missing Data Completion (DMC), to reduce motion-related artifacts compared to current best practice, and others, for MRI acquisition in developmental populations with high motion.

2018 - Present
Creating a Developmental Atlas of Brain Connectivity
PI
This proposal aims to generate a Developmental Atlas of Brain Connectivity that combines all publicly available brain connectivity data, currently from more than 15,000 children and adolescents, into a single consistently processed and quality-controlled dataset that can be used by medical researchers as a 'gold-standard' reference of typical development.

2019 - Present
Lesion network mapping of Autism-related Symptoms
PI
This project seeks to understand whether there is a particular network of regions impacted by lesions that are associated with social network impoverishment or loss of social skills, beyond that which can be explained by post-stroke depression and other independent risk factors.

2020 - Present
Predicting infantile spasms after perinatal stroke using lesion network imaging/damage assessment
Co-PI
With Co-PI Jurriaan Peters MD PhD. This project seeks to determine if the development of infantile spasms after pre- or perinatal stroke is related to lesion location/network involvement and can be predicted from such.

2021 - Present
Improving sustained attention in Attention-Deficit/Hyperactivity Disorder with real-time fMRI neurofeedback
Co-PI
With Co-PI Simon Warfield PhD. This project seeks to optimize methods for modifying brain activity/connectivity using endogenous neuromodulation techniques to improve a measurable behavioral outcome, i.e., attention in patients with ADHD, or face recognition ability in patients with ASD.

Report of Local Teaching and Training

Teaching of Students in Courses

2018 - 2021	Practice of Medicine (POM): Interviewing and Communication Skills (ICS)	Harvard Medical School
	1st year medical students	3-hr sessions every other week (13 sessions) per academic year

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

2017 - 2018	Pediatric Neurology NP Lecture Series: Clinical Neuroimaging Curriculum	Boston Children's Hospital
	Pediatric Neurology Nurse Practitioners	3 x 1-hr lectures
2017 - 2021	Child Neurology Residency Core Curriculum: Clinical Neuroimaging	Boston Children's Hospital
	Child and Adult Neurology Residents	5 x 1-hour lectures per academic year (4 in 2017-2018)
2019	Child Neurology Residency Core Curriculum: Personal Finance Bootcamp	Boston Children's Hospital
	Child and Adult Neurology Residents	1-hour lecture
2020 - 2021	Child Neurology Residency Academic Retreats: Presentations include CV and Biosketch Preparation; Launching a Research Career	Boston Children's Hospital
	Child Neurology Residents	2 to 4 x 1-hr workshops

Clinical Supervisory and Training Responsibilities

2015 - 2016	Chief Resident in Child Neurology: In-patient and out-patient service supervision	Mayo Clinic
	Child neurology residents	Over one academic year
2021 - Present	Attending Physician - Neurology Consult Service	Boston Children's Hospital
	Child and Adult neurology residents and HMS medical students	2 weeks/year of 24/7 call

Research Supervisory and Training Responsibilities

2017 - 2020	Supervision in Laboratory for Brain Network Imaging and Modulation.	Beth Israel Deaconess Medical Center
	Research assistants, postdoctoral fellows, biostatisticians	1-hr lab meeting per week and 1:1 supervision 1-2 hrs per week per fellow/research assistant
2017 - Present	Supervision of 1-2 rotating medical students and research fellows in the Laboratory of Computational Radiology	Boston Children's Hospital
	Medical students and research fellows	1:1 supervision 1-2 hrs per week per fellow

2020 - Present	Supervision in the BWH Center for Brain Circuit Therapeutics Research assistants and post-doctoral fellows	Brigham and Women's Hospital 1-hr lab meeting per week and 1:1 supervision 1-2 hrs per week per fellow/RA

Formally Mentored Harvard Medical, Dental, and Graduate Students

2018 - 2019　Ivry Zagury-Orly, HMS class of 2020 / Candidate for MD/MMSc in Medical Education, University of Montreal
　　Accomplishments: "Performance on the Benton Face Recognition Task demonstrates a persistent correlation with ADOS Social Affect across age, sex, and IQ in multiple NDAR datasets" – Submitted for presentation at 2020 International Society for Autism Research meeting.

Other Mentored Trainees and Faculty

2017 - 2019　Louis Soussand, MS / Senior Data Scientist, French Assistance Publique, Hospitaux de Paris
Career Stage: Senior research assistant/biostatistician *Mentoring Role:* Research advisor *Accomplishments:* Authorship of multiple neuroimaging projects as well as creation of computing infrastructure to allow advanced statistical analysis of large neuroimaging datasets through a web-based interface.

2018 - 2021　Tamar Caceres, MD / Pediatric Neurology and Neurodevelopmental Disabilities Resident, Boston Children's Hospital
Career Stage: Neurology Resident *Mentoring Role:* Research and career development mentor as part of the BCH Neuro RAMP (Neurology Resident Advisor and Mentor Program)

2019 - 2022　Mallory Kroeck, MA
Career Stage: Research Assistant *Mentoring Role:* Mentor *Accomplishments:* Accepted to Washington State PhD Program for Psychology.

2020 - 2021　Ayesha Imran, Emmanuel College class of 2021 / BS Degree, Emmanuel College
Career Stage: Undergraduate Student *Mentoring Role*: Project advisor *Accomplishments*: Internship – Completion of a Senior research project based on her one-year internship.

2020 - 2022　Jing Jiang, MD / Assistant Professor, University of Iowa
Career Stage: Postdoctoral *Mentoring Role:* Co-mentor *Accomplishments:* Postdoctoral at Brigham and Women's Hospital.

2020 - 2022　Peter McManus, BS / Degree Candidate, Buffalo State Medical School
Career Stage: Research Assistant *Mentoring Role:* Mentor *Accomplishments:* Authorship of two manuscripts on research to identify neuroanatomical substrates underlying symptoms common in autism and epilepsy; generation of the GSP1000 dataset described below.

2020 - Present　Alyssa Edwards, Case Western Reserve School of Medicine class of 2024
Career Stage: Graduate Student *Mentoring Role*: Research advisor *Accomplishments*: Summer Research Intern – Currently a first-year medical student at Case Western Reserve School of Medicine, Alyssa has been actively engaged in research with me and was recently awarded a Dean's Research Fellowship stipend for her 2021 summer research in our lab.

2021 - 2022   Arina Ovchinnikova, Emmanuel College class of 2022 / BS Degree Candidate, Emmanuel College
Career Stage: Undergraduate Student *Mentoring Role*: Project advisor
Accomplishments: Internship – Completion of a Senior research project based on her one-year internship.

2022 - Present   Meera Basu, MD
Career Stage: Pediatric Neurology Resident *Mentoring Role:* Mentor
Accomplishments: PGY-4.

2022 - Present   Wendy Herman, MD
Career Stage: Pediatric Neurology Resident *Mentoring Role:* Mentor
Accomplishments: Awarded R25 as PGY-4.

Formal Teaching of Peers
No presentations below were sponsored by 3rd parties/outside entities

2020	Neuroimaging Essentials for the Neurologist	Single presentation
	Michael J. Bresnan Child Neurology Course	Boston, Massachusetts
	Boston Children's Hospital	

Local Invited Presentations
No presentations below were sponsored by 3rd parties/outside entities

2016   Mortality and comorbidities in narcolepsy: a population-based cohort study / Grand Rounds
Department of Neurology, Mayo Clinic

2020   Using other clinical cohorts to understand ASD (and maybe generate new treatment targets) / Lecture
Glahn Laboratory Invited Speaker Series
Department of Psychiatry, Boston Children's Hospital

2020   Bedside to Bedside Translational Neuroimaging: Asking causal questions about ASD symptoms using *other* clinical cohorts / Brainstorming
2 Brookline Place Talk Series
Departments of Neurology, Psychiatry, and Developmental and Behavioral Pediatrics, Boston Children's Hospital

2020   Using other clinical cohorts to understand ASD (and maybe generate new treatment targets) / Lecture
Fetal-Neonatal Neuroimaging and Developmental Science Center (FNNDSC) Invited Speaker Series
Department of Radiology, Boston Children's Hospital

2020   Bedside to Bedside Translational Neuroimaging: Asking causal questions about ASD symptoms using *other* clinical cohorts / Lecture
Meet the Clinical Researcher Series
F.M. Kirby Neurobiology Center, Boston Children's Hospital

Report of Regional, National and International Invited Teaching and Presentations
No presentations below were sponsored by 3rd parties/outside entities

Regional
  2019   Tubers associated with infantile spasms impact a common brain network in TSC / Lecture - Invited Speaker
Young Investigator Presentation at the Meeting of the Greater Boston Epilepsy Society
Boston, Massachusetts

National
  2016   Junior Member Seminar 2: Residents: Finding a fellowship / Seminar - Co-Chair
45th Annual Meeting of the Child Neurology Society
Vancouver, Canada

  2016   Platform Session 1 / Platform session - Moderator
45th Annual Meeting of the Child Neurology Society
Vancouver, Canada

  2017   Junior Member Seminar 2: Residents: Finding a fellowship / Seminar - Co-Chair
46th Annual Meeting of the Child Neurology Society
Kansas City, Kansas

  2017   Platform Session 1 / Platform session - Moderator
46th Annual Meeting of the Child Neurology Society
Kansas City, Kansas

  2018   Platform Session 1 / Platform session - Moderator
47th Annual Meeting of the Child Neurology Society
Chicago, Illinois

  2018   A Low-Cost, High-Fidelity Simulation Model for Vaginal Hysterectomy / Oral Presentation - Co-Author
American Urogynecologic Society 29th Annual Scientific Meeting/Pelvic Floor Disorders Week
Chicago, Illinois

  2019   Platform Session II: Epilepsy and Mitochondrial Disease / Platform session - Moderator
48th Annual Meeting of the Child Neurology Society
Charlotte, North Carolina

  2020   Creating the Early Investigators Special Interest Group / Interview - Discussant
https://www.childneurologysociety.org/video/creating-the-early-investigators-special-interest-group-recorded-at-boston-childrens-hospital/
Child Neurology Society Website
Boston, Massachusetts

  2020   A pathway to identifying neuromodulation targets in non-lesional neurodevelopmental disorders / Lecture - Invited Speaker
NYC Neuromodulation 2020
Virtual Event

  2021   Bedside to Bedside Translational Neuroimaging: Asking causal questions about ASD symptoms / Lecture - Invited Speaker
Brain Connectivity and Cognition Lab Invited Speaker Series

Department of Psychology, University in Miami
Virtual Event

2021   The Future: Studies in Developmental Cognitive Neuroscience / Lecture - Invited
              Speaker
              Presidential Symposium: The CNS at 50! Past, Present, and Future
              50th Annual Meeting of the Child Neurology Society
              Boston, Massachusetts

International
2009   Finding putative functional areas using rs-fcMRI and DTI by computing gradients
              along the cortical surface / Oral Presentation - Author & Presenter (Selected Oral
              Abstract)
              15th Annual Meeting of the Organization for Human Brain Mapping
              San Francisco, California

2019   Tubers associated with infantile spasms impact a common brain network in tuberous
              sclerosis complex. Abst 20 / Oral Presentation - Co-Author
              2019 International TSC Research Conference
              Toronto, Ontario, Canada

2020   Early-Stage Investigator Special Interest Group (Organizer) / Seminar - Moderator
              Joint 16th International Child Neurology Congress / 49th Annual Meeting of the Child
              Neurology Society
              Virtual Event

2020   Junior Member Session 2: Nurturing the Global Pipeline of Academic Child
              Neurologists (Organizer) / Seminar - Moderator
              Joint 16th International Child Neurology Congress / 49th Annual Meeting of the Child
              Neurology Society
              Virtual Event

Report of Clinical Activities and Innovations

Current Licensure and Board Certification

2012 - 2016	Minnesota Medical License
2016 - Present	Board Certification in Neurology with Special Qualification in Child Neurology American Board of Psychiatry and Neurology
2016 - Present	Massachusetts Medical License

Practice Activities

2016 - Present	Ambulatory care	Behavioral Neurology Division and Autism Spectrum Center, Boston Children's Hospital	1 half-day session per week
2021 - Present	Inpatient care	Child Neurology Consult Service, Boston Children's Hospital	2 weeks per year

Report of Technological and Other Scientific Innovations

Application of Graph Theory techniques to understand brain development (2007 - 2011)	As part of a team led by Steven Petersen and Bradley Schlaggar at Washington University in St. Louis, my colleagues and I pioneered the use of Graph Theory to unravel the relationships between regions in the brain as revealed by functional connectivity MRI. My role was developing the software tools to apply graph theory to our data. Our initial analyses of the default and executive control networks of the brain and their development from childhood into adolescence have been cited more than 10,000 times across the neuroscience literature. We also applied this technique to adolescents with Tourette syndrome, as an example of the clinical applicability of these techniques to gain unique insights into this disorder.
Use of Functional Connectivity to define human cortical and subcortical functional areas (2008 - 2012)	As part of a team led by Drs. Steven Petersen and Bradley Schlaggar at Washington University in St. Louis, I developed methods that use non-invasive functional MRI data to identify functional areas and networks across the brain. I created a method to divide the brain into functional areas, based on identifying regional transitions in functional connectivity, i.e., correlations in the spontaneous activity of the brain that reflect functional relationships between regions. Since its publication in 2008 (PMID: 18367410), this technique has been cited more than 500 times and is one of the defining methods of the Human Connectome Project (NIH U54 MH091657). The method is applicable to subcortical structures such as the basal ganglia and has yielded robust findings in adults as well as children.
Standardization and Portability of Neuroimaging Analyses (2017 - Present)	I am deeply interested in technology that will not only improve research but will also directly impact clinical care. As such, I have encouraged the introduction and incorporation of research tools into graduate medical education, via presentations and publications that demonstrate the utility of rapidly deployable software, e.g., "Docker" containers and "NeuroDebian" virtual machines; I continue to collaborate with other research centers to generate accessible and reproducible research packages such as the Brain Imaging Data Structure Applications (BIDS Apps). I have promoted principled statistical approaches to imaging analyses and shared high-utility datasets for others to use. My goal is to provide a path of entry for trainees to become familiar with neuroimaging tools, hasten the bench-to-bedside journey for novel discoveries, and thereby improve patient care.
Using clinical cohorts and brain connectivity to identify brain networks important for neurodevelopmental disorders (2017 - Present)	I am focused on identifying the neuroanatomy that underlies specific neurologic and psychiatric symptoms in children and adolescents, with the goal of generating treatment targets for neuromodulatory therapies such as TMS or fMRI neurofeedback. Working with collaborators at University of Iowa, we were able to identify why some children develop severe cognitive and affective disturbances after cerebellar tumor resection, while others do not. Separately, I have also leveraged data from patients who developed 'face-blindness,' and have identified a specific network of brain regions where brain injury causes difficulty with face recognition, a symptom important for autism spectrum disorders. In addition, I have aided colleagues with the investigation of critical brain regions involved in migraine and several other clinical syndromes. And most recently, I have determined a network-based origin for infantile spasms in children with Tuberous Sclerosis Complex; if treated early, these spasms are a modifiable risk factor for developing autism.

| Creation and release of the open-source publicly available "GSP1000 Preprocessed Connectome" (2020) | Functional connectivity analysis (the understanding and analysis of correlated spontaneous activity seen in related brain regions) requires data from hundreds if not thousands of participants to generate a stable population estimate. I led a team that carefully pre-processed and packaged a 'publicly available' version of the MGH Genomics Superstruct Project, i.e., generated completely from publicly available data, using publicly available open-source tools, to help standardize functional connectivity analyses. Unlike existing similar datasets, the GSP1000 contains data for all 'voxels' in the brain, both grey and white matter, which uniquely suits it for lesion network mapping.
Cohen AL, Soussand L, **McManus P, Fox MD. "GSP1000 Preprocessed Connectome". Harvard Dataverse. 2020 Nov 17. V1. doi: 10.7910/DVN/ILXIKS. |

Report of Education of Patients and Service to the Community

Activities
Those activities below sponsored by 3rd parties/outside entities are so noted and the sponsor(s) is identified.

| 2017 | Device Squad Podcast on Digital Tools for Autism Spectrum Disorder & Asperger's Syndrome / Discussant (Propelics)
Participated in a recorded panel discussion on digital tools for Autism Spectrum Disorder & Asperger's Syndrome with Steven Brykman, Digital Strategist and UX Architect for Propelics, (myself), Michael McWatters, UX Architect at TED Conferences, and Cathy Farmer, Board of Directors Member for the Organization for Autism Research.
https://soundcloud.com/propelics/digital-tools-for-autism |
| 2021 | Singapore American School Podcast / Interviewee
Interviewed by 8th grade students on how schools can incorporate programs for children with Autism Spectrum Disorders. |

Report of Scholarship
ORCID: 0000-0001-6557-5866

Peer-Reviewed Scholarship in print or other media

Research Investigations

1. Grady RM, Akaaboune M, **Cohen AL**, Maimone MM, Lichtman JW, Sanes JR. Tyrosine-phosphorylated and nonphosphorylated isoforms of alpha-dystrobrevin: roles in skeletal muscle and its neuromuscular and myotendinous junctions. The Journal of cell biology. 2003 Mar 3; 160(5): 741-52. PubMed PMID: 12604589; PubMed Central PMCID: PMC2173352.

2. Fair DA, Schlaggar BL, **Cohen AL**, Miezin FM, Dosenbach NU, Wenger KK, Fox MD, Snyder AZ, Raichle ME, Petersen SE. A method for using blocked and event-related fMRI data to study "resting state" functional connectivity. NeuroImage. 2007 Mar 1; 35(1): 396-405. PubMed PMID: 17239622; PubMed Central PMCID: PMC2563954.

3. Dosenbach NU, Fair DA, Miezin FM, **Cohen AL**, Wenger KK, Dosenbach RA, Fox MD, Snyder AZ, Vincent JL, Raichle ME, Schlaggar BL, Petersen SE. Distinct brain networks for adaptive and stable task control in humans. Proceedings of the National Academy of Sciences of the United States of America. 2007 Jun 26; 104(26): 11073-8. PubMed PMID: 17576922; PubMed Central PMCID: PMC1904171.

4. Fair DA, Dosenbach NU, Church JA, **Cohen AL**, Brahmbhatt S, Miezin FM, Barch DM, Raichle ME, Petersen SE, Schlaggar BL. Development of distinct control networks through segregation and integration. Proceedings of the National Academy of Sciences of the United States of America. 2007 Aug 14; 104(33): 13507-12. PubMed PMID: 17679691; PubMed Central PMCID: PMC1940033.

5. Dosenbach NU, Fair DA, **Cohen AL**, Schlaggar BL, Petersen SE. A dual-networks architecture of top-down control. Trends in cognitive sciences. 2008 Mar 1; 12(3): 99-105. PubMed PMID: 18262825; PubMed Central PMCID: PMC3632449.

6. Fair DA, **Cohen AL**, Dosenbach NU, Church JA, Miezin FM, Barch DM, Raichle ME, Petersen SE, Schlaggar BL. The maturing architecture of the brain's default network. Proceedings of the National Academy of Sciences of the United States of America. 2008 Mar 11; 105(10): 4028-32. PubMed PMID: 18322013; PubMed Central PMCID: PMC2268790.
   - Preview: In This Issue. Proceedings of the National Academy of Sciences of the United States of America. 2008 Mar 11;105(10):3659-3660.

7. **Cohen AL**, Fair DA, Dosenbach NU, Miezin FM, Dierker D, Van Essen DC, Schlaggar BL, Petersen SE. Defining functional areas in individual human brains using resting functional connectivity MRI. NeuroImage. 2008 May 15; 41(1): 45-57. PubMed PMID: 18367410; PubMed Central PMCID: PMC2705206.

8. Church JA, Fair DA, Dosenbach NU, **Cohen AL**, Miezin FM, Petersen SE, Schlaggar BL. Control networks in paediatric Tourette syndrome show immature and anomalous patterns of functional connectivity. Brain : a journal of neurology. 2009 Jan 1; 132(Pt 1): 225-38. PubMed PMID: 18952678; PubMed Central PMCID: PMC2638693.

9. *Fair DA, ***Cohen AL**, Power JD, Dosenbach NU, Church JA, Miezin FM, Schlaggar BL, Petersen SE. Functional brain networks develop from a "local to distributed" organization. PLoS computational biology. 2009 May 1; 5(5): e1000381. PubMed PMID: 19412534; PubMed Central PMCID: PMC2671306.

10. White BR, Snyder AZ, **Cohen AL**, Petersen SE, Raichle ME, Schlaggar BL, Culver JP. Resting-state functional connectivity in the human brain revealed with diffuse optical tomography. NeuroImage. 2009 Aug 1; 47(1): 148-56. PubMed PMID: 19344773; PubMed Central PMCID: PMC2699418.

11. Nelson SM, Dosenbach NU, **Cohen AL**, Wheeler ME, Schlaggar BL, Petersen SE. Role of the anterior insula in task-level control and focal attention. Brain structure & function. 2010 Jun 1; 214(5-6): 669-80. PubMed PMID: 20512372; PubMed Central PMCID: PMC2886908.
   - Editorial Preview: Craig, AD Once an island, now the focus of attention. Brain structure & function. 2010 Jun;214(5-6):214: 395.

12. Barnes KA, **Cohen AL**, Power JD, Nelson SM, Dosenbach YB, Miezin FM, Petersen SE, Schlaggar BL. Identifying Basal Ganglia divisions in individuals using resting-state functional connectivity MRI.

Frontiers in systems neuroscience. 2010 Jun 10; 4: 18. PubMed PMID: 20589235; PubMed Central PMCID: PMC2892946.

13. Nelson SM, **Cohen AL**, Power JD, Wig GS, Miezin FM, Wheeler ME, Velanova K, Donaldson DI, Phillips JS, Schlaggar BL, Petersen SE. A parcellation scheme for human left lateral parietal cortex. Neuron. 2010 Jul 15; 67(1): 156-70. PubMed PMID: 20624599; PubMed Central PMCID: PMC2913443.
    - Preview: Uncapher MR, Hutchinson JB, Wagner AD. A roadmap to brain mapping: toward a functional map of human parietal cortex. Neuron. 2010 Jul 15;67(1):5-8. PubMed PMID: 20624586.

14. Dosenbach NU, Nardos B, **Cohen AL**, Fair DA, Power JD, Church JA, Nelson SM, Wig GS, Vogel AC, Lessov-Schlaggar CN, Barnes KA, Dubis JW, Feczko E, Coalson RS, Pruett, Jr JR, Barch DM, Petersen SE, Schlaggar BL. Prediction of individual brain maturity using fMRI. Science (New York, N.Y.). 2010 Sep 10; 329(5997): 1358-61. PubMed PMID: 20829489; PubMed Central PMCID: PMC3135376.
    - Letter to the Editor: Brandeis D, Koenig T, Wackermann J. Individual brain maturity: from electrophysiology to FMRI. Brain Topogr. 2011 Oct;24(3-4):187-8. Epub 2011 Apr 24. PubMed PMID: 21516489.
    - Author Response: Dosenbach, NUF, Petersen, SE, Schlaggar, BL. Brain Topogr. 2011 Oct;24(3-4):189-91.

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Narrative Report

I am a child neurologist and physician-scientist whose Area of Expertise is Investigation. I specialize in using translational neuroimaging to understand and develop treatments for autism spectrum disorders and other neurodevelopmental conditions. I earned my baccalaureate, medical, and graduate doctoral degrees at Washington University in St. Louis, where I gained a broad background in both cellular and systems neurosciences, with specific training and expertise in functional connectivity neuroimaging. Following my graduate education, I completed a combined residency in Pediatrics and Child Neurology during which I became interested in childhood conditions affecting cognition including autism and neurodevelopmental disorders. I then went on to complete a Behavioral Neurology fellowship at Boston Children's Hospital and post-doctoral (T32) translational research training in the Computational Radiology Laboratory at BCH and the Laboratory for Brain Network Imaging and Modulation at Beth Israel Deaconess Medical Center. I am now focused on localizing the cause of specific symptoms seen in autism (K23MH120510) to generate potential treatment targets for clinical trials of non-invasive neuromodulation while I also continue to care for patients in the Autism Spectrum Center and Behavioral Neurology Clinic at BCH.

My research interests and expertise include constructing and applying novel neuroimaging methods to understand brain development, with a focus on cognitive, neuropsychiatric, and neurodevelopmental disorders, i.e., disorders that affect wide-ranging networks in the brain, and I am known nationally and internationally for several of my contributions. During my graduate years, I created a method to non-invasively divide the brain into functional areas using the brain's spontaneous activity; work that has been cited over 500 times and is one of the defining methods of the Human Connectome Project. My colleagues and I also pioneered the use of Graph Theory to understand the development of the network architecture of the brain from childhood into adulthood; work that has been cited over 10,000 times across the neuroscience literature. During residency, I also became deeply interested in translating technology to directly impact clinical care and focused on ways to bring research-grade neuroimaging software tools into the clinic for exploratory clinical research and bedside teaching. This led to involvement in an international effort to standardize neuroimaging research software "containers", the Brain Imaging Data Structure Applications project.

Now, my growing research program focuses on identifying the neuroanatomical substrate for symptoms common in autism and other neurodevelopmental conditions with the goal of generating targets for noninvasive treatment modalities, e.g., TMS and/or real-time fMRI-based neurofeedback, by: 1) Generation of circuit-based hypotheses for symptom generation from cohorts with lesions, tubers, tumor resections, epilepsy foci, etc., that share specific symptoms, 2) Validation of these hypotheses through prospective neuroimaging study of patients with neurodevelopmental disorders affected by those same symptoms, and 3) Testing whether modulating these circuits through non-invasive therapy affects the associated symptom, e.g., through behavioral and fMRI-based neurofeedback, or TMS/TCDS-based interventions. This work is tremendously collaborative, and I work closely with the Computational Radiology Laboratory and the Laboratories of Cognitive Neurosciences at BCH and the Center for Brain Circuit Therapeutics at Brigham and Women's Hospital. I am also working towards generating a large-scale database of all available pediatric connectivity neuroimaging data, i.e., a developmental connectome, for rapid hypothesis testing.

As a clinical fellow and post-doctoral researcher, my teaching activities focused on mentoring and teaching research fellows and research assistants. As an Instructor and now Assistant Professor in Neurology, I have also developed a growing Clinical Neuroimaging curriculum for the Boston Children's

Neurology Residency Program and Nurse Practitioners and also serve as a preceptor for the HMS 1st year medical student Interviewing and Communication Skills (ICS) / Practice of Medicine (POM) course. I also train and mentor post-doctoral fellows, research assistants, and student interns in my own laboratory and in the Center for Brain Circuit Therapeutics at Brigham and Women's Hospital with my close collaborator Dr. Michael Fox.

My passion and diligence have established my reputation as a self-motivated investigator, clinician, and educator known for my collegiality, professionalism, and empathy with patients and their families. Because of my experiences in basic neuroscience research and my clinical training in Child Neurology, I am acutely aware of the need for "closing the gap" with bench-to-bedside translational research in neurodevelopmental disorders and have made this a focus of my career.