



# Marc D. Rudolph

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## Education

Curriculum Vitae 2021-2022

## Connect

Website: [marcdrudolph.com](http://marcdrudolph.com)  
Academic Works: [ResearchGate](#) | [Google Scholar](#)  
Professional: [Portfolio Website](#)  
Neuro Outreach: [Sabin Braaains!!!](#) | [NW Noggin](#)  
Twitter: [Profile](#)

## University of North Carolina Chapel Hill, Doctoral Candidate

Degree: Cognitive Neuroscience & Psychology; Quantitative Minor

## Portland State University, B.S.

Degree: Psychology & Neuroscience

Courses in speech pathology, economics, sociology, & urban development

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## Related Work Experience & Training

### Neuroimaging & Analysis Tools

Matlab, R, Python, Bash/Shell,  
Psychopy, MRtrix, CONN Toolbox,  
FSL, SPM12, Caret5, Gephi,  
Cytoscape, NX Client, Clear Canvas,  
Mindware Biolab, SPSS, MS Suite,  
Linux, Unix

### Methods

Resting-state fMRI  
Diffusion MRI  
Task-based fMRI  
Electrocardiogram (ECG)  
Galvanic Skin-Response (GSR)  
Neuropsychological Assessment  
Experimental Cognitive Paradigms

### Interests

Aging  
Cancer  
Cognition  
Complex Illness & Mental-Health  
Data Visualization  
Functional & Structural  
Connectivity  
Lifespan Development  
Multimodal Methodology  
Network Models, Graph Theory &  
Community Detection  
Risk & Resilience  
Statistics & Machine-learning for  
Classification & Prediction

## Oregon Health & Science University (OHSU)

### Research Assistant II (July 2013 - August 2017)

Fair Neuroimaging Lab, Dr. Damien A. Fair (PI)

- Administer neuropsychological assessments
- Trained MRI operator/technician for ADHD, ASD, & Infant Studies
- Responsible for data management and analysis across studies
- Mentor students and lab volunteers, support outreach
- Participate in, conduct, and present research
- Lead investigator for collaboration with MacArthur Network Foundation on Law & Neuroscience under supervision of Dr. Fair

### Research Assistant (May 2012 - June 2013; Volunteer)

Developmental Brain Imaging Lab, Dr. Bonnie J. Nagel (PI)

- MRI assistant, image preprocessing and data entry
- Assisted on project assessing sex differences in resting-state functional connectivity (rs-fcMRI) amongst amygdalar subregions
- Devised and conducted research examining rs-fcMRI differences in adolescence using a novel functionally-defined parcellation of the insular cortex

### Research Assistant I (Part-time: May 2012 - June 2013; Volunteer: January 2011 - May 2012). ADHD Research Lab, Dr. Joel T. Nigg (PI)

- Administer neuropsychological & intelligence measurements
- Experience with ECG and GSR, including cleaning of ECG Data
- Scoring, data entry for research documents (Conners, KSAD, etc)
- Experience working with children (7-13) in a research setting

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## Teaching Experience

### University of North Carolina - Chapel Hill

#### Graduate Teaching Assistant

- Research Methods in Psychology, Dr. Patrick R. Harrison
- Sensation & Perception, Dr. Vicki R. Chanon
- Neuroscience, Dr. Monica M. Gaudier-Diaz

### Portland State University

#### Undergraduate Teaching Assistant\*

- Psychopharmacology, Dr. Bill W. Griesar
- \*Served as courses first official teaching assistant

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## Upcoming Publications & Current Projects

Rudolph M. D., Muscatell K. A., & Cohen J. R. (*In Prep*). **Utilizing cognitive neuroscience and machine learning to advance prediction of cognitive impairment in breast cancer survivors.**

Rudolph M. D., Cohen J. R., & Madden D. J. (*In Prep*). **Global & local impacts of white matter hyper-intensities on structural brain network organization and communication capacity in neurocognitive aging.**

Rudolph M. D., Cohen J.R., & Dayan A. **A comparative assessment of metrics that quantify functional brain network redundancy in individuals with and without Alzheimer's Dementia.**

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## Ad-Hoc Reviewer:

- Neurobiology of Aging (2021)
- Developmental Cognitive Neuroscience (2018-2019)

## Co-Reviewer:

- European Journal of Neurology (Dr. David J. Madden; 2021)
- Human Brain Mapping (Dr. Damien A. FAir; 2016)
- Neuroimage (Dr. Alice M. Graham; 2014)

## Selected Publications & Manuscripts

[ResearchGate](#) & [Google Scholar](#) Profiles

\*Rudolph, M. D. (2021). **A Review of Shared & Unique Mechanisms Underlying cognitive dysfunction & neuropathology to inform data-driven network-based models of risk & resilience.** *Independent comprehensive review submitted to the department of Psychology & Neuroscience to advance to candidacy.*

Alvarez, G. M., Rudolph, M. D., Cohen, J. R., & Muscatell, K. A. (2021). **Lower Socioeconomic Position is Associated with Greater Activity and Integration within an Allostatic-Interoceptive Brain System in Response to Affective Stimuli.** *Submitted to the Journal of Cognitive Neuroscience.*

Henry, T. R., Duffy, K. A., Rudolph, M. D., Nebel, M. B., Mostofsky, S. H., Cohen, J. R. (2019). **Bridging global and local topology in whole-brain networks using the network statistic jackknife.** *Network Neuroscience.* Advance publication. [https://doi.org/10.1162/netn\\_a\\_00109](https://doi.org/10.1162/netn_a_00109)

\*Rudolph, M. D., Graham, A. M., Feczko, E., Miranda-Dominguez, O., J. M. Rasmussen, J. M., Nardos, R., ... Fair, D. A. (2018). **Maternal IL-6 during pregnancy can be estimated from newborn brain connectivity and predicts future working memory in offspring.** *Nature Neuroscience*, 21(5), 765-772. <http://doi.org/10.1038/s41593-018-0128-y>

\*Rudolph, M. D., Miranda-Domínguez, O., Cohen, A. O., Breiner, K., Steinberg, L., Bonnie, R. J., ... Fair, D. A. (2017). **At risk of being risky: The relationship between "brain age" under emotional states and risk preference.** *Developmental Cognitive Neuroscience*, 24, 93-106. <http://doi.org/10.1016/j.dcn.2017.01.010>

\*Graham, A. M., Buss, C., Rasmussen, J. M., Rudolph, M. D., Demeter, D. V., Gilmore, J. H., ... Fair, D. A. (2016). **Implications of newborn amygdala connectivity for fear and cognitive development at 6-months-of-age.** *Developmental Cognitive Neuroscience*, 18, 12-25. <http://doi.org/10.1016/j.dcn.2015.09.006>

\*Alarcón, G., Cservenka, A., Rudolph, M. D., Fair, D. A., & Nagel, B. J. (2015). **Developmental sex differences in resting state functional connectivity of amygdala sub-regions.** *NeuroImage*, 115, 235-244. <http://doi.org/10.1016/j.neuroimage.2015.04.013>

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## Invited Talks

**Society for Research on Child Development (SRCD; April, 2017)**  
Discuss effects of pre and postnatal stress on newborn functional brain development with a special focus on poverty and socioeconomic status.

## Talks at UNC

**UNC Cognitive Psychology and Neuroscience Symposium 5th-Year Talk (October, 2021):** The aging connectome, white matter lesions, & cognition: A multimodal assessment of structural and functional brain network organization and information transfer capacity using machine learning & network science.

**UNC Cognitive Psychology and Neuroscience Symposium 4th-Year Talk (May, 2020):** A comprehensive machine-learning approach to assess the effects of chemotherapy on cognition.

**UNC Cognitive Psychology and Neuroscience Symposium 3rd-Year Talk (May, 2019):** Assessing chemotherapy & cognition. A cognitive neuroscience-inspired approach.

**UNC Cognitive Psychology and Neuroscience Symposium 2nd-Year Talk (May, 2018):** Assessing components of general cognitive domains in healthy aging.

**UNC Human Neuroimaging Group (HNG; November, 2017)**  
Discuss (1) the negative impacts of motion on functional connectivity estimates, and (2) the positive and negative effects of global signal regression.

## Selected Conferences & Presentations

**Cognitive Aging Conference (2018)** \*Marc D. Rudolph, Keely A. Muscatell, & Jessica R. Cohen. **Assessing chemotherapy & cognition. A cognitive neuroscience-inspired approach.**

**FLUX Conference (2016)** \*Marc D. Rudolph, Alice M. Graham, Pathik Wadhwa, Sonja Entringer, Jerod Rasmussen, Claudia Buss, Damien A. Fair. **Within and between network functional connectivity is associated with mean maternal IL-6.**

**FLUX Conference (2014)** \*Marc D. Rudolph, Robert P. Cary, Alice M. Graham, Pathik Wadhwa, Sonja Entringer, Jerod Rasmussen, Claudia Buss, Damien A. Fair. **Community Detection & Network Topology During the First Year of Life – A Resting-State Functional Connectivity Study.**

**Society for Neuroscience (2014)** \*Claudia Buss, Alice M. Graham, Marc D. Rudolph, Jerod Rasmussen, Sonja Entringer, Pathik D. Wadhwa, Damien A. Fair. **Maternal interleukin-6 concentrations during pregnancy and newborn functional brain connectivity.**

**Society for Neuroscience (2013)** \*Marc. D. Rudolph, Gabriel. Alarcon, Madison. L. Stroup, Damien A. Fair, Bonnie J. Nagel. **Segmenting the insular cortex in adolescents – A resting state functional connectivity study.**

**Society for Neuroscience (2013)** \*William Griesar, Elias Shaw, Kamran Lehman, Marc D. Rudolph, Jeff Leake. **Cross-institutional collaboration in neuroscience outreach: Undergraduates, graduates, middle and high schoolers get together to learn about the brain.**

## Mentored Projects & Presentations

**North Carolina School of Science & Mathematics**  
Graduating Class Research Symposium (High-School)

\*Velez-Gonzalez I., Cohen JR, Rudolph M. D. (2021-2022).  
**Structural brain network organization in aging.**

\*Emehel C., Cohen J. R., Rudolph M. D. (2019-2020).  
**Assessing the effects of depression and stress on cognition in breast cancer survivors.**

\*Liu C., Cohen J. R., Rudolph M. D. (2018-2019).  
**Fluctuation rates within the D2 Test of Attention in relation to sustained attention.**

**Oregon Health & Science University Research Week**  
OHSU Equity Research Program (Undergraduate)

\*Zhu, J., Fair D. A., Rudolph M. D. (2014). **Classification and prediction of neural networks Influenced by emotional contexts using resting state functional connectivity and machine-learning.**

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## Diversity & Inclusion

**Member.** UNC Pathways to Graduate School Committee

**Member.** UNC RA-ships & Outcomes Graduate & Faculty Committee

**Member.** UNC Increasing Diversity in Speakers Series Committee

**Graduate Student Representative.** UNC Cognitive Program Admissions Committee (Fall 2020)



## Mentoring & Outreach

### University of North Carolina, Chapel Hill (2018-2019)

**Isaac Velez-Gonzalez (High-School). North Carolina School of Science & Mathematics Research Internship Program**

Project: Understanding the mechanisms that contribute to age-related structural brain-network reorganization. Secondary emphasis on data visualization with R and Shiny.

**Chloe Emehel (High-School). North Carolina School of Science & Mathematics Research Internship Program**

Project: Understanding the role of depression and stress in chemotherapy-related cognitive dysfunction in women breast cancer survivors.

**Christina Liu (High-School). North Carolina School of Science & Mathematics Research Internship Program**

Project: Understanding the complex nature of chemotherapy-related cognitive dysfunction in women breast cancer survivors.

### Oregon Health & Science University (2013 - 2014)

**Jennifer Zhu (Pre-Med). OHSU Summer Equity Research Program Funded by MacArthur Neuroscience & Law Consortium**

Project: Classification and prediction of functional neural networks influenced by emotional contexts using functional connectivity and machine-learning.

### Portland State University (2013 - 2014)

**Sabin Braaains!!! Neuroscience Outreach Portland, Oregon Program Creator & Instructor**

Designed & created an project-based after-school interactive course allowing for content delivery informed by student interests. Oversight of an undergraduate volunteer, creation and maintenance of projects and program website. Produced student-led videos for SFN.

**NW Noggin. Neuroscience Outreach Portland, Oregon (2011-2016) Outreach Volunteer**

Helped establish and expand STEAM focused Neuroscience and Art outreach programs throughout the Portland metro area in underserved middle and high-schools. Responsible for content creation and instruction, as well as assisted with program development and oversight of undergraduate volunteers.

**AKA Science. Portland, Oregon (2013-14) Volunteer Instructor**

After-school instructor at a local Portland middle-school (10-15 students). Program provided by Impact Northwest. AKA science provides pre-packaged science kits complete with lesson plans for different science themes throughout the school year to foster interest in science and the creative process.

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## Research Grants

**National Research Service Award (NRSA-F31; Scored 40; Unfunded).** Rudolph M. D. (2020). Structural & functional brain network correspondence underlying cognition in aging individuals with & without breast cancer.

**National Science Foundation (NSF; Unfunded)** Rudolph M. D. (2017). Chemotherapy-induced cognitive decline in breast cancer survivors: Assessing mechanisms and changes in specific components of cognition and functional brain network organization.

**National Science Foundation (NSF; Unfunded)** Rudolph M. D. (2016). Modelling complex multivariate relationships between pre- and postnatal risk factors impacting early functional brain development.

## Awards

**Travel Award.** UNC Dashiell Student Travel Award. (2019)  
Funding provided for conference travel expenses.

**Fellowship.** Sackler Summer Institute Fellowship (2016).  
Symposium on Neuroscience & Law for the MacArthur Foundation.

**Outreach Award. SUN Community Schools (2014).**  
Funding provided for the development and instruction of a summer neuroscience outreach program.

**Travel Grant. Society for Neuroscience (2013).**  
American Psychological Foundation & Portland State University  
NW Noggin Outreach Poster Presentation.

**Outreach Award. Portland State University (2013).**  
Funding provided for the creation and implementation of a guidebook for incoming volunteers with the NW Noggin Outreach Program.

**Pell Grant Recipient. Portland State University (2011)**  
Displaced worker status.

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## Academic Groups

### UNC Graduate Student Network Neuroscience Group

Created a working group focused on application of network science and neuroimaging (structural and functional brain connectivity) to substantive issues in psychology & neuroscience.

### Duke-UNC Structure-Function Neuroimaging Group

Created a working group of graduate and postdoctoral scholars interested in discussing the use of diffusion-weighted imaging and construction of structural brain networks in aging. Additional focus on methods and discussion of papers fusing structural and functional neuroimaging data.

### Human Neuroimaging Group (HNG)

Official working group created by the UNC Psychology & Neuroscience department consisting of faculty and students interested in neuroimaging methods.

### Seminar in Network Analysis Group (SNAC)

Multi-institutional and interdisciplinary group of research scientists interested in network science.