Saren H. Seeley, Ph.D.

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EDUCATION

2021	Ph.D.	Clinical Psychology · University of Arizona	Tucson, AZ, US
		$ Predoctoral\ Internship \cdot Health\ Service\ Psychology \cdot Pittsburgh\ VA $	Pittsburgh, PA, US
2016	M.A.	Clinical Psychology · University of Arizona	Tucson, AZ, US
2013	B.A.	Psychology · CUNY Hunter College	New York, NY, US
2008	Certif.	Neighborhood Playhouse School of Theatre	New York, NY, US

HONORS & AWARDS

2020	PEO Scholar Award (\$20,000) · PEO International
2019	Data Science Ambassador · University of Arizona College of Science
2019	Clinical Science Student Training Award \cdot Academy of Psychological Clinical Science
2019	Galileo Scholar Award · University of Arizona College of Science
2019	Selected to attend Neurohackademy 2019 · University of Washington eScience Institute
2017	Science Alliance Leadership Training Program Fellow · New York Academy of Sciences
2017	NSF GRFP (Honorable Mention) · National Science Foundation
2015	Student Poster Award · Society for Psychophysiological Research
2015	Student Travel Award · Society for Psychophysiological Research
2015	Travel Award · University of Arizona Graduate and Professional Student Council
2013	Undergraduate Research Initiative Fellowship · CUNY Hunter College

RESEARCH SUPPORT

2019-20 National Institute on Aging · Ruth L. Kirschstein NRSA Individual Predoctoral Fellowship 1F31AG062067: "Dynamic functional connectivity as a neurobiological mechanism of adaptation in widowed older adults" (\$43,081)

PROFESSIONAL EXPERIENCE - RESEARCH

- 2021-- **Icahn School of Medicine at Mount Sinai** · *Postdoctoral Research Fellow* New York, NY, US fMRI and behavioral investigation of PTSD and psychological resilience in 9/11 World Trade Center responders (PIs: Adriana Feder, M. Mercedes Perez-Rodriguez, Daniela Schiller).
- 2015-19 **University of Arizona** · *Graduate Research Assistant* Tucson, AZ, US Resting state fMRI and behavioral investigation of prolonged grief disorder in the Grief, Loss, and Social Stress Lab (PI: Mary-Frances O'Connor).
- 2013-15 **CUNY Hunter College** · Postbaccalaureate Research Assistant

Senior research assistant and fMRI coordinator/analyst for the Regulation of Emotions in Anxiety and Depression Lab (PI: Douglas Mennin).

2014 **CUNY Hunter College** · *Postbaccalaureate Research Assistant* New York, NY, US Research assistant for the Stress and Coping Lab (PI: Michael A. Hoyt).

2012-13 **CUNY Hunter College** · *Undergraduate Research Assistant*Undergraduate research assistant and honors thesis student in the Regulation of Emotions in Anxiety and Depression Lab (PI: Douglas Mennin).

PROFESSIONAL EXPERIENCE - CLINICAL

2020-21 **VA Pittsburgh Medical Center** · *Predoctoral Intern in Health Service Psychology* Pittsburgh, PA, US Rotations: geriatric neuropsychology; substance use disorders; serious mental illness. Interventions: CBT, CBT-P, SST, ACT, MI, Seeking Safety. Settings: Outpatient (individual & group); Residential (group).

2018-20 **Banner University Medical Center** · *Extern, Early Psychosis Intervention Center* Interventions: CBT for psychosis (CBT-P), Social Skills Training (SST) Setting: Outpatient (individual, family, & group).

2018-20 **Banner University Medical Center** · Extern, Cystic Fibrosis Clinic (Pulmonology) Tucson, AZ, US Interventions: ACT, brief interventions, consultation-liaison services. Setting: Outpatient (individual & group), Medical inpatient (individual).

2016-17 **University of Arizona** · *Graduate Student Therapist, Behavioral Health Clinic* Tucson, AZ, US Interventions: CBT, ACT. Setting: Outpatient (individual).

Clinical Rater/Structured Clinical Assessment:

2021- Icahn School of Medicine at Mount Sinai
PTSD clinical trial and research (SCID-5, CAPS-5, MADRS)

2016-20 Banner University Medical Center/University of Arizona
OCD clinical trial; MDD research (SCID-5, YBOCS, MADRS, HAM-D)

2013-15 CUNY Hunter College
GAD open trial and research (SCID-IV)

Licensure:

2022-23 **New York State – Limited Permit in Psychology** (#68-P116694-01) New York, NY, US NYS licensure expected by Fall 2023.

PROFESSIONAL EXPERIENCE – TEACHING

Introduction to Psychology (undergraduate; Spr. 16)

2022 **Icahn School of Medicine at Mount Sinai** · *Guest Lecturer* New York, NY, US
Two guest lectures on grief and prolonged grief disorder for psychiatry PGY3 resident didactics.

2016-19 **University of Arizona** · *Graduate Teaching Assistant*Psychotherapy Interventions: Acceptance and Commitment Therapy (graduate; Spr. 19)

Psychotherapy Interventions: Cognitive Behavioral Therapy (graduate; Fa. 18)

Developmental Psychology (undergraduate; Spr. 17)

Mind, Brain, & Behavior (undergraduate; Fa. 16)

Technical Trainings:

2022	Icahn School of Medicine at Mount Sinai "Using Minerva (HPC) to Preprocess Data with fMRIPrep"	New York, NY, US
2019	Neurohackademy Summer Institute "Intro to MRIQC for fMRI Quality Control" (breakout session)	Seattle, WA, US
2020 2019 2019 2018	University of Arizona "The Brain Imaging Data Structure (BIDS) Ecosystem and fMRIPrep" Software/Data Carpentries workshop · Teaching Assistant "Getting Started with BIDS and fMRIPrep" "Introduction to the Brain Imaging Data Structure (BIDS) and fMRIPrep"	Tucson, AZ, US
Extramura	al Didactics:	
2018	Banner-UMC Pediatric Pulmonary Center · <i>Invited Presenter</i> "Understanding LGBTQ+ Students, for School Healthcare Professionals"	Tucson, AZ, US
2018	Banner-UMC Pediatric Pulmonary Center · <i>Invited Presenter</i> "Self-Care for Caregivers"	Tucson, AZ, US
2017	La Frontera Center · <i>Guest Presenter</i> "Improving Behavioral Health for People with Cystic Fibrosis"	Tucson, AZ, US

PUBLICATIONS

Journal articles

2023	Provins, C., MacNicol, E., Hagemann, P., Seeley, S.H., & Esteban, O. (In press). Quality Control in
functional MRI studies with MRIQC and fMRIPrep. Frontiers in Neuroimaging.	
	doi:10.3389/fnimg.2022.1073734

- Seeley, S.H., Andrews-Hanna, J.R., Allen, J.J.B., & O'Connor, M-F. Dwelling in prolonged grief: Resting state functional connectivity during oxytocin and placebo administration. *Human Brain Mapping*, 1-13. doi:10.1002/hbm.26071
- O'Connor, M-F. & **Seeley, S.H.** Grieving as a form of learning: Insights from neuroscience applied to grief and loss. *Current Opinion in Psychology, 43,* 317-322.
- Scult, M.A., Fresco, D.M., Gunning, F.M., Liston, C., **Seeley, S.H.**, Garcia, E. & Mennin, D.S. Changes in functional connectivity following treatment with Emotion Regulation Therapy. *Frontiers in Behavioral Neuroscience*, *13*, 10. doi:10.3389/fnbeh.2019.00010
- Seeley, S.H., Chou, Y.-H., & O'Connor, M.-F. (2018). Intranasal oxytocin and *OXTR* genotype effects on resting state functional connectivity: A systematic review. *Neuroscience and Biobehavioral Reviews*, 1-17. doi:10.1016/j.neubiorev.2018.09.011
- Renna, M.E., **Seeley, S.H.**, Heimberg, R.G., Etkin, A., Fresco, D.M., Mennin, D.S. Increased attention regulation from Emotion Regulation Therapy for generalized anxiety disorder. *Cognitive Therapy and Research*, 42(2), 121-134. doi:10.1007/s10608-017-9872-7
- Renna, M.E., Chin, S., **Seeley, S.H.,** Fresco, D.M., Heimberg, R.G., & Mennin, D.S. The use of the mirror tracing persistence task as a measure of distress tolerance in generalized anxiety disorder. *Journal of Rational Emotive & Cognitive-Behavior Therapy*, 36(1), 80-88. doi:10.1007/s10942-017-0274-2
- Fresco, D.M., Roy, A.K., Adelsberg, S., **Seeley, S.H.**, García-Lesy, E., Liston, C. & Mennin, D.S. (2017). Distinct functional connectivities predict clinical response with Emotion Regulation Therapy. *Frontiers in Human Neuroscience*, 11, 1-13. doi:10.3389/fnhum.2017.00086
- Seeley, S.H., Yanez, B., Stanton, A.L. & Hoyt, M.A. (2017). Emotional approach and heart rate variability following an emotional processing intervention. *Cognition and Emotion* 31(5), 988-994. doi:10.1080/02699931.2016.1170667
- Seeley, S.H., Mennin, D.S., Aldao, A., McLaughlin, K.A., Rottenberg, J., & Fresco, D.M. (2015). Impact of comorbid depression on subjective and physiological responses to emotion in generalized anxiety disorder. *Cognitive Therapy and Research*, 1-14. doi:10.1007/s10608-015-9744-y

Seeley, S.H., García, E., & Mennin, D.S. (2015). Recent advances in laboratory assessment of emotion regulation. *Current Opinion in Psychology*, 3, 58-63. doi:10.1016/j.copsyc.2015.02.009

Under review:

Arizmendi, B.J., **Seeley, S.H.,** Allen, J.J.B., Killgore, W.D.S., Andrews-Hanna, J. & O'Connor, M.F. Feeling a pull to be close: The effect of oxytocin on approach and avoidance in complicated grief. (*Initial submission*).

Norbury, A., **Seeley, S.H.,** Perez-Rodriguez, M.M., & Feder, A. Functional neuroimaging of resilience to trauma: convergent evidence and challenges for future research. (*Resubmission*).

Book chapters

Seeley, S. H.*, Boukezzi, S.*, DePierro, J. M., Charney, D. S., & Feder, A. (In press). Biological mechanisms of stress resilience: Human and animal studies. In *Charney and Nestler's Neurobiology of Mental Illness (eds. Charney, D.S, Nestler, E.J., Buxbaum, J.D., Binder, E., Gordon, J.A., and Picciotto, M.)* (6th ed.). Oxford University Press.

*co-first author

Editorial and science writing

- Seeley, S. H., & O'Connor, M-F. (2022, May 25). "Seeing Grieving as Learning Explains Why the Process Takes Time." *AEON+Psyche Magazine*. https://psyche.co/ideas/seeing-grieving-as-learning-explains-why-the-process-takes-time
- Seeley, S. H. (2021, December 21). "The Indifference Point." *The Xylom*. https://www.thexylom.com/post/the-indifference-point

PRESENTATIONS

- Seeley, S. H. & O'Connor, M-F. (2021, January). *Patterns of static and dynamic functional connectivity associated with oxytocin and complicated grief in older adults*. Presentation for the Neurobiology of Grief International Network (NOGIN) Social Neuroscience of Grief conference.
- Seeley, S. H. & O'Connor, M-F. (2020, January). *Complicated grief and resting state functional connectivity in older adults*. Presentation for the Neurobiology of Grief International Network (NOGIN) Social Neuroscience of Grief conference.
- Fresco, D. M., Roy, A. K., Adelsberg, S., **Seeley, S.H.**, Garcia, E., Liston, C., Mennin, D. S. (2017, November). *Distinct functional connectivities predict clinical response with Emotion Regulation Therapy*. In M. T. Moore (Chair), Mechanisms of change in mindfulness-based interventions. Symposium presented at the annual meeting of the Association of Behavioral and Cognitive Therapies, San Diego, CA.
- Seeley, S.H., Mennin, D.S., Heimberg, R.G., Fresco, D.M., & Etkin, A. (2015, November). Conflict adaptation and attentional change in Emotion Regulation Therapy for generalized anxiety disorder. In S. Steinman & L. Hallion (Chairs). Neurocognitive Underpinnings of Anxiety: Implications for Theory and Treatment. Symposium presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Chicago, IL.
- Seeley, S.H., Abbas, M., Mennin, D.S., Aldao, A., & Fresco, D.M. (2015, May). Common and specific patterns of autonomic and subjective responsivity among the distress disorders. In A. Aldao & S. Hofmann (Chairs), Emotion Regulation & Psychopathology: Identifying Transdiagnostic and Disorder-Specific Deficits. Symposium presented at the annual meeting of the Association Psychological Science, New York, NY.
- Seeley, S.H., Mankus, A.M., Renna, M., Cooper, S.E., Mennin, D.S., Fresco, D.M., & Heimberg, R.G. (2014, March). *Emotion Regulation Therapy for generalized anxiety disorder: Effects on response inhibition to task-irrelevant emotional content*. In A. Aldao & D. Klemanski (Chairs), Emotion Regulation Flexibility in the Treatment of Anxiety Disorders. Symposium presented at the annual meeting of the Anxiety and Depression Association of America, Chicago, IL.

Garcia, E., **Seeley, S.H.,** Quintero, J.M., Fonseca, L., Mennin, D.S. (2014, November). *Electrocortical and autonomic indices of self-referential processing*. In S. Berthod & E. Garcia (Chairs). Biosignatures of Affective Psychopathology: Insights from Psychophysiological Measures of Emotional Processing. Symposium presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, Philadelphia, PA.

Poster presentations

- Provins, C., Schöttner, M., Dayan, M., Nastase, V., Lunde, J., Benach, O. M., MacNicol, E., Savary, E., **Seeley, S. H.,** Hagen, M. P., Zou, Y., Hagmann, P. & Esteban, O. (2023). *Signal-To-Noise Ratio Estimates Predict Head Motion Presence in T1-Weighted MRI*. Submitted for the 2023 annual meeting of the Organization for Human Brain Mapping. doi.org/10.31219/osf.io/7vqzr
- Leska, T., Schreiber, Z., Astorino, E., Verghese, M., **Seeley, S.H.**, Cahn, L., Aaronson, C., Brinkman, H., Kowalchyk, M., Boettche, M., Knaevelsrud, C., Pietrzak, R.H., Feder, A. *Linguistic Predictors of Response to Internet-Based Written CBT for PTSD in 9/11 World Trade Center Responders and Survivors*. Poster accepted for the annual meeting of the Anxiety and Depression Association of America, April 2023, Washington D.C..
- Seeley, S.H., Schreiber, Z., Verghese, M., Leska, L.S., Astorino, E., Morris, L.S., Hermans, E., Pietrzak, R.H., Perez-Rodriguez, M.M. & Feder, A. *Greater Social Cognition-related Right Temporal Pole Activation in World Trade Center Responders with PTSD: Preliminary Evidence*. Poster presented at the annual meeting of the American College of Neuropsychopharmacology, December 2022, Phoenix AZ.
- Friedman, S.E., Palitsky, R.P., Ruiz, J., Wilson, D.T., **Seeley, S.H.**, Kassman, L.E., Sullivan, D., O'Connor, M-F. *Grief-Relevant Emotional Interview Induces Elevated Blood Pressure in Bereaved Older Adults*. Poster presented at the annual meeting of the American Psychosomatic Society, March 2020, Long Beach CA.
- Seeley, S.H., Arizmendi, B.A., O'Connor, M-F. *Desperately Seeking: Precentral Gyrus Linked to a Cuneus-Precuneus Resting State Network in Complicated Grief.* Poster presented at the annual meeting of the Society for Psychophysiological Research, October 2019, Washington DC.
- Quintero, J.M., Seeley, S.H., Renna, M.R., & Mennin, D.S. Indices of Trait Emotionality and Emotion Regulation: A Concordance Study Between Myoelectrical Gastric Reactivity and Heart Rate Variability. Poster presented at the annual meeting of the Society for Psychophysiological Research, October 2018, Quebec City, Quebec, Canada.
- Quintero, J.M., **Seeley, S.H.**, Renna, M.R., & Mennin, D.S. *Trait Indices of Emotionality and Emotion Regulation: An Examination of Individual Differences in Emotional Processing and Myoelectrical Gastric Reactivity*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, November 2017, San Diego, CA.
- Quintero, J.M, **Seeley, S.H.**, Renna, M.E., & Mennin, D.S. *Links Between Individual Differences in Trait Emotionality and Altered Gastric Myoelectrical Activity*. Poster presented at the annual meeting of the Anxiety and Depression Association of America, April 2017, San Francisco, CA.
- Sandman, C.F., Raab, H.A., **Seeley, S.H.**, García-Lesy, E., Fresco, D.M., Mennin, D.S., & Liston, C. Greater Prefrontal Recruitment Associated with Clinical Improvement and Metacognitive Skills in Generalized Anxiety Patients Following Emotion Regulation Therapy. Poster presented at the annual meeting of the Anxiety and Depression Association of America, April 2017, San Francisco, CA.
- Raab, H.A., Sandman, C.F., **Seeley, S.H.,** García-Lesy, E., Fresco, D.M., Mennin, D.S., & Liston, C. Increased Prefrontal Activation to Negative Stimuli Is Associated with Clinical Improvement Following Emotion Regulation Therapy for Generalized Anxiety Disorder. Poster presented at the annual meeting of the Society for Neuroscience, November 2016, San Diego, CA.
- Seeley, S.H., García-Lesy, E., Mennin, D.S. *The Role of Trait Worry in Temporal Dynamics of the Evoked Cardiac Response to Affective Images*. Poster presented at the annual meeting of the Society for Psychophysiological Research, September 2015, Seattle, WA.

- Renna, M.E., **Seeley, S.H.**, Chin, S., Heimberg, R.G., Fresco, D.M., Mennin, D.S. *The Utility of a Behavioral Measure of Distress Tolerance in Generalized Anxiety Disorder*. Poster presented at the annual meeting of the Association of Psychological Science, May 2015, New York, NY.
- Renna, M.E., **Seeley, S.H.**, Chin, S., Heimberg, R.G., Fresco, D.M., Mennin, D.S. *The Mirror Tracing Persistence Task as a Distress Tolerance Marker in Generalized Anxiety Disorder*. Poster presented at the annual meeting of the Anxiety and Depression Association of America, April 2015, Miami, FL.
- Adelsberg, S., Roy, A.K., **Seeley, S.H.**, Garcia, E., Renna, M.E., Fresco, D.M., & Mennin, D.S. *Changes in Emotion Regulation Circuitry Associated with a Regulation-Based Intervention for Generalized Anxiety Disorder*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, November 2014, Philadelphia, PA.
- Renna, M., **Seeley, S.H.,** Chin, S., Heimberg, R.G., Fresco, D.M., Mennin, D.S. *Preliminary Evidence for a Behavioral Measure of Distress Tolerance in Generalized Anxiety Disorder*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, November 2014, Philadelphia, PA.
- Garcia, E., Quintero, J. M., **Seeley, S.H.**, Fonseca, L., Mennin, D.S. *Dispositional Positive Self-Referential Processing Modulates Late-Positive Potential Responses in an Emotional-Motivational Context.*Poster presented at the annual meeting of the Association for Psychological Science, May 2014, San Francisco, CA.
- Garcia, E., **Seeley, S.H.,** Fonseca, L., Quintero, J. M., Renna, M., Skytte-O'Toole, M.S., Mennin, D.S. *Positive Self-Referential Processing Modulates Electrocortical Responses to Emotional Stimuli*. Poster presented at the annual meeting of the Anxiety and Depression Association of America, March 2014, Chicago, IL.
- Renna, M., **Seeley, S.H.,** Mankus, A.M., Garcia, E., Mennin, D.S., Fresco, D.M., Heimberg, R.G. *Emotion Regulation Therapy for Generalized Anxiety Disorder: Exploration of Heart Rate Variability and Inhibition of Emotional Interference.* Poster presented at the annual meeting of the Anxiety and Depression Association of America, March 2014, Chicago, IL.

DISSERTATIONS/THESES

- "Dynamic Functional Connectivity as a Neurobiological Mechanism of Adaptation in Widowed Older Adults" [Doctoral dissertation]. Committee chair: Mary-Frances O'Connor, Ph.D.
- "Functional Neuroanatomy of Grief and Perceived Discrimination in South Asian Women in the United States" [Masters thesis]. Committee chair: Mary-Frances O'Connor, Ph.D.)
- "Anxious, Not Depressive Symptoms Predict Heart Rate Variability in Generalized Anxiety Disorder" [Undergraduate honors thesis]. Supervisor: Douglas S. Mennin, Ph.D.

SERVICE ACTIVITIES

- 2023 Grant reviewer · Pilot Project Program · Women's Health Research at Yale (WHRY)
- 2022 Research Mentor · Summer Program in Computational Psychiatry Education (SPICE) at ISSMS
- 2021-23 *Mentor* · Next-Gen. Psych Scholars · nextgenpsychscholars.com
- 2021 Mentor · Psychin' Out graduate application support program · psychinout.org
- 2020-21 Member · Diversity Committee · VA Pittsburgh Behavioral Health Service Line
- 2019-20 Member · Student Wellness Committee · U. Arizona Psychology Department
- 2016-18 Student Representative · Diversity Committee · U. Arizona Psychology Department
- 2016-17 Student Representative · Southern Arizona Psychological Association
- Fa. '17 Mentor · Arizona's Science, Engineering and Math Scholars (ASEMS) Program · U. Arizona
- Fa. '16 Travel Grants Reviewer · U. Arizona Graduate & Professional Student Council

Panel and outreach talks

2022	"Self-care and Boundary Setting as a Graduate Student" [panel] · Next-Gen. Psych Scholars Program
2021	"Chronic Illness and Disability in Graduate School" [panel] · Next-Gen. Psych Scholars Program
2019	"Mental Health in Graduate School", in "Real Talk: Diverse Perspectives on Graduate School" ·
	Diversity Committee & Psi Chi · U. Arizona Psychology Department

Student supervision and research mentorship

2022	Matina Kakalis [medical student] \cdot "Social cognitive function and PTSD symptom dimensions in 9/11 World Trade Center responders"
2022	Thomasina Leska* [$medical student$] · "Linguistic predictors of response to internet-based written CBT for PTSD in 9/11 World Trade Center responders and survivors"
2022	Adam Reig [high school student] · "Assessing social controllability in PTSD using the Ultimatum Game"
2015	Maha Abbas [<i>undergrad. honors thesis</i>] · "The relationship between generalized anxiety disorder and heart rate variability in response to emotion-eliciting films"
2015	Ilmira Estil* [<i>undergrad. honors thesis</i>] · "Emotion generation vs. emotion regulation: differentiating self-reported emotional intensity and negative self-referential processing"
2015	Shehan Chin* [<i>undergrad. honors thesis</i>] · "The mirror tracing task as a measurement of distress tolerance in generalized anxiety disorder"
2015	Virginia Milieris* [undergrad. honors thesis] · "Implications for distress tolerance, affect intensity, and

*co-supervised

Ad-hoc peer review

Journal of Psychiatry Research, Social Neuroscience, PLOS ONE, Cognitive Affective & Behavioral Neuroscience, European Child & Adolescent Psychiatry, Perspectives on Psychological Science *Reviewer profile*: https://www.webofscience.com/wos/author/record/260782

SPECIALIZED TRAININGS

2019	Neurohackademy Summer Institute (2 weeks) · University of Washington	Seattle, WA, US
2017	Reproducible fMRI Workshop (5 days) · University of North Carolina	Carrboro, NC, US
2017	Science Alliance Leadership Training (4 days) · New York Academy of Science	s. Atlanta, GA, US
2017	Software/Data Carpentries Workshop (2 days) · U. Arizona BIO5 Institute	Tucson, AZ, US
2015	fMRI Acquisition and Analysis Course (3 days) · MIND Research Network	Albuquerque, NM, US

SKILLS

Languages: R (advanced), MATLAB (intermediate), Unix/bash (intermediate), HTML & CSS (intermediate), LATEX (beginner), Python (beginner).

Neuroimaging modalities: fMRI, resting-state fMRI, group ICA.

emotion regulation in the cold pressor task"

Neuroimaging software & tools: SPM12, FSL, BIDS, GIFT, fMRIPrep, MRIQC, TEDANA, Freesurfer

Other specialized software: SPSS, Biopac/AcqKnowledge, QRSTool/CMetX, Kardia, Plotly, electronic health records (EPIC; Cerner; CRPS).

Other tools for reproducible science: Open Science Framework, git/GitHub, R Markdown, Jupyter notebooks.