NEUROPSYCHOLOGY

Rotation Coordinator: LAURA GRANDE, PH.D., ABPP/cn
Psychology Service (116B)
VA Boston Healthcare System
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Training Locations:
Jamaica Plain Campus
West Roxbury Campus

Number of Interns: 3

~ OVERVIEW ~

The Neuropsychology rotation provides clinical, didactic, and academic training to develop advanced knowledge of brain-behavior relationships and skills needed for neuropsychological assessment and treatment of the cognitive, behavioral, and emotional impact of brain dysfunction and pathology. Interns will demonstrate a highly-developed level of competence in clinical neuropsychology (NP) as well as the education and training necessary for postdoctoral fellowship. The program adheres to the Houston Conference standards (Archives of Clinical Neuropsychology, 1998, 13, 160-166) for specialty training in clinical neuropsychology and aims to prepare trainees for board certification in clinical neuropsychology.

The intern works with the supervisor to translate referral questions into testable hypotheses that can be addressed on the basis of objective data and information gathered from the interview. Interns use a flexible battery approach that matches assessment measures to the identified referral question and patient characteristics. Tests drawn from a wide variety of neuropsychology measures are selected based on their psychometric properties, demonstrated validity, and appropriateness of available normative data. Each evaluation simulates application of the scientific method applied at the individual level; hypotheses are identified and tested with objective measures and related to findings based in the empirical literature, integrating research with clinical practice.

Our approach to assessment integrates contemporary research and theory from cognitive neuroscience and psychometrics, with classic methods of clinical observation, and thorough medical record review in the service of making rational and empirical clinical predictions about the impact of brain dysfunction on cognition and adaptive behavior. In keeping with the "Boston Process Approach," in addition to the strong emphasis placed on the development of assessment skills through the use of standardized measures of cognition, interns also gain an understanding and appreciation for empirically-demonstrated qualitative aspects of test performance (e.g., error types), and the unique insights these observations offer in understanding brain-behavior relationships. Our training also places a strong emphasis on the importance of providing detailed recommendations for referral sources, the patient and the patient's family/caregivers. We aim to translate findings of objective cognitive measures into tailored recommendations focused on compensation for deficits and accentuation of strengths. Interns learn to integrate research literature and psychometric theory to make logical, empirically derived clinical predictions. Additionally, we assist patients and providers in implementing these recommendations, providing evidence-based psychoeducational interventions, as appropriate.

~ Clinical Experience ~

This rotation provides experience in a number of clinical settings, allowing the intern to obtain a unique array of training experiences. While the specific clinical settings vary, the underlying goal and training emphasis remains consistent. In each setting, interns will be involved in the clinical interview, administration, data scoring, report writing, patient feedback, and multidisciplinary team consultation / collaboration. Interns will provide clinical services within most of the settings described below, though duration of time dedicated to each service is not equal. Interns typically complete three neuropsychological assessments per week, two of which are briefer (2 - 3 hour) evaluations. There may also be opportunity to gain exposure to the Neurological exam and provide consultative services to Neurologists within the VA Boston Epilepsy Division and/or Memory Disorders Clinic. Interns are primarily at the Jamaica Plain Campus, although frequently spend one or occasionally two days per week at the West Roxbury campus. Travel to the Brockton campus is optional.

- **Neuropsychology Consult Service (NCS):** Interns serve as consultants and provide assessments as part of the neuro-psychology consult service at VA Boston Healthcare System. Patients are referred to this service from a variety of sources; referrals typically include cognitive dysfunction secondary to a medical or psychiatric condition, epilepsy, ADHD, LD, stroke, traumatic brain injury and dementia. Neuropsychology consults involve a clinical interview, test administration, scoring of test data, test interpretation, written report, and in-person feedback to patients. The majority of evaluations are completed at the

Jamaica Plain Campus. Neuropsychological evaluations may also be completed through Neurology (e.g., Long-Term Monitoring on the Epilepsy unit) at West Roxbury.

In addition to the therapy experience required by the internship, the neuropsychology intern may provide neuropsychology-specific time-limited interventions within the rotation through the NCS. Opportunities for neuropsychology-specific interventions include psychoeducational/cognitive rehabilitation interventions (individual and group co-leadership). The intern selects one or two groups to co-lead during this eight-month rotation. Current groups include Memory and Aging, ADHD, Stroke Support Group, and Seizure Support Group.

- Locations - Jamaica Plain Campus primarily; some valuations at West Roxbury Campus.

- **Geriatric Research Education and Clinical Center (GRECC) Clinic:** The intern functions as part of a multidisciplinary team that includes a geriatrician, nurse practitioner, social worker, pharmacist, and geriatric medicine fellows. The neuropsychological assessment of elderly patients, who are often frail as well as physically and cognitively compromised, requires an alternative to the time consuming, multiple hour test batteries often used in clinical assessments. Most GRECC assessments involve 1 - 2 hours of testing. The trainee is responsible for the clinical interview, testing, scoring of test data, test interpretation, and written report of the neuropsychological evaluation, as well as feedback to the patient and the team.
  - Location – Jamaica Plain and West Roxbury Campuses.

- **Polytrauma Clinic:** The Polytrauma Network System of Care was initially developed to address the complex needs of individuals returning from deployment as part of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF), many of whom were exposed to blasts and/or sustained brain injuries. Additionally, issues related to trauma exposure and readjustment as well as other comorbid conditions are common for this patient population. Neuropsychology trainees serve as part of the multidisciplinary Polytrauma Clinical Team that also includes a physiatrist and social worker. Interns will provide cognitive and mental health screenings to outpatients seen by that service and contribute to treatment planning. The brief screenings are designed to quickly assess for mood and trauma as well as possible history of traumatic brain injury. The clinic is currently broadening its services to offer neuropsychological assessment to amputees with vascular risk factors through

the Amputee System of Care, and to stroke patients who have been treated through Physical Medicine and Rehabilitation. In addition, a psychoeducational Stroke Support Group will be offered through this clinic.
  - Location - Jamaica Plain Campus.

- **Inpatient:** West Roxbury and Brockton campuses of the VA Boston Healthcare System provide specialized inpatient care to the veterans of the Boston area. Frequently, the referring provider and medical team has some concern regarding the patient's cognitive functioning and ability to care for himself/herself following discharge from the hospital. Interns will complete approximately 4 - 8 inpatient evaluations through the Physical Medicine and Rehabilitation service (West Roxbury). These assessments are completed on an inpatient basis and include all aspects of the neuropsychological assessment (interview, test administration, test scoring, interpretation, and report writing). In this setting, the intern is frequently required to work very efficiently to provide feedback to the medical team. Interns may also elect to complete neuropsychological evaluations in Inpatient Psychiatry (Brockton); these evaluations often include issues of differential diagnosis and capacity. Interns choosing to participate in our Brockton clinic will need a vehicle or would be encouraged to carpool, as the shuttle schedule will not provide sufficient time for this setting.
  - Locations - West Roxbury and Brockton Campuses.

~ SUPERVISION ~

Neuropsychology interns will have the opportunity to work with multiple neuropsychology supervisors during the 8-month rotation. Each intern is assigned one primary supervisor who is responsible for completing formal evaluations and providing general mentorship to the intern throughout the rotation. Although one primary supervisor is assigned, interns will also work closely with other primary supervisors, and may receive supervision from secondary supervisors as well. Interns will also gain exposure to supervision of practicum students.

Primary Neuropsychology Supervisors:

- Laura Grande, Ph.D., ABPP/cn, Neuropsychology Training Coordinator; Director of Neuropsychology Consult Service
- Deepa Acharya, Ph.D., ABPP/cn
- Susan McGlynn, Ph.D., ABPP/cn
- Colleen Jackson, Ph.D.
- Elizabeth Leritz, Ph.D.

Secondary Neuropsychology Supervisors:

- William Milberg, Ph.D., ABPP/cn
- Scott Fish, Ph.D.
- Jennifer Vasterling, Ph.D.
- Christopher Brady, Ph.D.
- Catherine Fortier, Ph.D.

~ DIDACTICS ~

Neuropsychology offers a number of specialty specific didactics. Well-known local and visiting scholars present at the neuropsychology and neuroimaging lecture series. These series are comprised of experts drawn primarily from the greater Boston cognitive neuroscience community, taking full advantage of the depth and breadth of relevant expertise centered at our university affiliates (Harvard and Boston University). Trainees also attend and present at the Neuropsychology Seminar series (weekly) that includes a combination of presentations from in-house faculty, student presentations, and journal club. Trainees are also encouraged to present at our monthly Neurobehavioral Rounds, which includes a case presentation and bringing the patient in to be interviewed by a senior discussant in front of the group.

- **Required:**
  - Neuropsychology Seminar Series: One to two hours per week.
  - Neuropsychology and Neuroimaging Lecture Series: Two hours per month.
  - Neurobehavioral Rounds: Approximately two hours per month.
  - Neurology Memory Disorders Case Conference: One hour per week for two-months.
  - Epilepsy Conference: One hour per week for two-months.

- **Optional:**
  - Neuroimaging Journal Club: One hour per month.
  - Neuroimaging Tutorial Series: One hour per month.
  - TBI and PTSD Journal Club: One hour weekly.
  - Boston NeuroRehab Group: Two hours per month.

~ SELECTION CRITERIA ~

Internship training for Neuro-psychology may take place within a “Match” rotation (i.e., eight-month) or as part of the intern’s second (i.e., four-month) rotation. Three interns will Match with the Neuropsychology rotation, and another three interns will have the briefer (four-month) second-rotation training opportunity. Although not guaranteed, additional hours of neuropsychology training may be available for those interns who train in the Neuropsychology four-month rotation, typically through the 8-month Geropsychology and Rehabilitation rotations.

Applicants interested in Neuropsychology as an 8-month "Match" rotation should have experience administering, scoring and interpreting neuropsychological tests and have typically completed dedicated graduate coursework focused on brain behavior relationships. Applicants who seek academic careers and have a clear commitment to neuropsychology are strongly encouraged to apply for the 8-month rotation. Students who have developed a recent interest in neuropsychology, or those desiring less intensive training, can receive it through the internship's four-month neuropsychology rotation. Interns participating in the 4-month rotation participate in a subset of the clinical and didactic activities described above.

~ RESEARCH ~

Neuropsychology strongly encourages the scientist-practitioner model and research opportunities reflect this training priority. Neuropsychology trainees have an abundance of funded projects to choose from that represent diverse aspects of neuropsychology, including the neuropsychology of aging and cerebrovascular risk factors, PTSD, TBI, MCI, memory disorders and test development / validation.

We have a strong group of 15+ research mentors, many of whom have nationally and internationally visible research programs. Available settings include several laboratories and major multi-project research centers (see below). These ongoing research programs provide interns with a variety of research opportunities including manuscript preparation, invited chapters and literature reviews, attendance at weekly lab meetings/research discussions, one-on-one research mentoring, journal peer reviews, archival data analysis, development of new studies, and grant preparation.

Neuropsychology interns with strong research interests may consider requesting a research externship, which can be up to 8 hours of protected time under the mentorship of one of the 15+ neuropsychology faculty. Requirements for a research externship include defense of the dissertation and demonstrated efficiency in clinical work. The minimum direct service requirements for the general internship still apply, which may require some adaptation of the activities described above. The mentoring supervisor meets weekly with the intern to provide guidance and supervision, and to monitor progress. For interns interested in pursuing this opportunity, a tailored research plan is developed in collaboration with the faculty supervisor. This plan outlines the specifics of the externship including the training goals and expectations.

- **Geriatric Neuropsychology Laboratory (GNL):** The Geriatric Neuropsychology Laboratory which was founded in 1981 has been to home to a number of internationally known research efforts. The research laboratory includes multiple principal investigators. A variety of interests are represented within the laboratory and currently funded projects include: investigation of

cardiovascular disease and frontal dysfunction in older African Americans; relating cortical functions to cerebrovascular disease and dementia risk; neuroanatomical changes associated with cardiovascular disease, dementia risk and MCI; classical learning in memory disordered patients and in dementia risk; delirium and cognitive function after coronary artery bypass surgery; and development of screening measures to identify cognitive impairment in the primary care setting. The GNL works closely with the VA Research Neuroimaging Center under the direction of David Salat, Ph.D., which will provide interns with the opportunity to learn about advanced structural and functional neuroimaging methods. A number of ongoing research projects provide the intern with a variety of research opportunities.

- Faculty: Co-Directors: William Milberg, Ph.D., ABPP/cn; Regina McGlinchey, Ph.D., Investigators: Betsy Leritz, Ph.D.; David Salat, Ph.D.; Catherine Fortier, Ph.D.; Laura Grande, Ph.D., ABPP/cn

Foley, J., Salat, D.H., Stricker, N.H., Zink, T.A.*, Grande, L.J., McGlinchey, R.E., Milberg, W.P. & Leritz, E.C. (2014). Interactive effects of Apo lipoprotein e4 and diabetes risk on later myelinating white matter regions in neurologically healthy older aged adults. American Journal of Alzheimer's Disease and Other Dementias, 29(3), 222-35. doi: 10.1177/1533317513517045.

Leritz, E.C., Shepel, J., Williams ,V.J., Lipsitz, L.A., McGlinchey, R.E., Milberg, W.P., & Salat, D.H. (2014). Associations between T1 white matter lesion volume and regional white matter microstructure in aging. Human Brain Mapping, 35(3), 1085-100. doi: 10.1002/hbm.22236.

Stricker, N.H., Salat, D.H., Foley, J.M., Zink, T.A.*, Kellison, I.L.*, McFarland, C.P.*, Grande, L.J., McGlinchey, R.E., Milberg, W P. & Leritz, E.C. (2013). Decreased white matter integrity in neuropsychologically-defined mild cognitive impairment is independent of cortical thinning. Journal of the International Neuropsychological Society, 19, 1-13. doi: 10.1017/ S1355617713000660.

- **Neuropsychology of PTSD:** Interests include neuropsychological, psychological, and health outcomes of war-zone deployment and other military health risks (e.g., neurotoxins, traumatic brain injury). Most of these studies employ longitudinal methodology and have been conducted within an epidemiological framework. There are opportunities to participate in: preparation of empirical publications, preparation of invited chapters and literature reviews,

attendance at weekly lab meetings/research discussions, one-on-one research mentoring, data analysis of existing data bases, development of new studies, assistance in preparing grants, journal peer reviews.

- Faculty: Jennifer J. Vasterling, Ph.D.; Susan P. Proctor, D.Sc.; Kevin Brailey, Ph.D., Brian Marx, Ph.D.; Laura Grande, Ph.D.,ABPP/cn; Lewina Lee, Ph.D., Anica Pless-Kaiser, Ph.D.

  Pless Kaiser, A., Proctor, S. P., & Vasterling, J. J. (in press). Consistency of reporting for stressful life events among non-deployed soldiers. Journal of Clinical Psychology.

  McFarland, C.P.*, Clark, J.B., Lee, L.O., Grande, L.J., Marx, B.P., & Vasterling, J.J. (2015, on-line ahead of print). Event-based prospective memory among veterans: The role of PTSD symptom severity in executing intentions. Journal of Clinical and Experimental Neuropsychology.

  Alosco, M. L.*, Aslan, M., Du, M., Ko, J., Grande, L., Proctor, S. P., Concato, J., & Vasterling, J. J. (2015, on-line ahead of print). Consistency of recall for deployment-related traumatic brain injury. Journal of Head Trauma Rehabilitation.

  Palumbo, D. J., Kapson, H. S., Lafleche, G., Vasterling, J. J., Marx, B. P., Franz, M., &Verfaellie, M. (2015). Alterations in autobiographical memory for a blast event in OEF/OIF veterans with mild TBI. Neuropsychology, 29(4), 543-549.

- **Memory Disorders Research Center (MDRC):** The MDRC studies memory using both neuropsychological and cognitive neuroscience approaches, with the goal of elucidating the cognitive and neural underpinnings of different forms of memory. The Center conducts cognitive neuropsychological studies of patients with MTL and frontal lobe lesions, clinical neuropsychological studies aimed at understanding the heterogeneity of cognitive and behavioral manifestations in TBI and anoxic brain injury, and neuroimaging studies of memory in healthy young and elderly individuals. There are opportunities to be involved in any of these approaches through active participation in ongoing studies, data analysis of existing data bases, and development of new studies. Interns are encouraged to attend weekly lab meetings, monthly patient rounds, and monthly research discussions.

- Faculty: Mieke Verfaellie, Ph.D., Margaret Keane, Ph.D., Ginette LaFleche, Ph.D., Scott Hayes, Ph.D.

  Grilli, M.D.*, & Verfaellie, M. (in press). Supporting the self-concept with memory: insight from amnesia. Social Cognitive and Affective Neuroscience.

  Grilli, M. D.* & Verfaellie, M. (2014). Personal semantic memory: insights from neuropsychological research on amnesia. Neuropsychologia, 17(61), 56-64. doi: 10.1016/ j.neuropsychologia.2014.06.012.

  Hayes, S.M., Alosco, M.L.*, Forman, D.E. The Effects of Aerobic Exercise on Cognitive and Neural Decline in Aging and Cardiovascular Disease. Curr Geriatr Rep. 2014 Dec;3(4):282-290.

  Race, E., LaRocque, K. F., Keane, M.M., and Verfaellie, M. (2013). Medial temporal lobe contributions to short-term memory for faces. Journal of Experimental Psychology: General, 142, 1309-1322

  Verfaellie, M., Lafleche, G., Spiro, A., & Bousquet, K. (2013). Neuro-psychological outcomes in OEF/OIF veterans with self-report of blast exposure: Associations with mental health, but not mTBI. Neuropsychology, 28, 337-46.

- **Translational Research Center for TBI and Stress Disorders (TRACTS):** TRACTS is a Center of Excellence hosted by the VA Boston Healthcare System and funded by the VA Rehabilitation Research and Development Service (VARRDS). The mission of TRACTS is to promote multidisciplinary research that will lead to innovations in the diagnosis and treatment of the complex issues presented by the growing population of veterans who suffer the consequences of mTBI occurring in the context of stress-related emotional disorders. TRACTS provides a unique infrastructure to create synergy between investigators working in a number of scientific disciplines (including clinical neuropsychology; clinical psychology / psychiatry; translational basic science; and brain imaging). The TRACTS data repository which may be accessed for selected research project contains over 2000 behavioral, medical and demographic variables for over 400 prospectively enrolled participants, 150 with longitudinal data). In addition, the repository contains extensive quantitative neuroimaging information and in the near future will also contain data on over 500,000 genetic SNPS. We anticipate numerous opportunities for interns to develop research interests and skills

related to the investigation of the joint effects of TBI and PTSD. TRACTS works closely with the VA Research Neuroimaging Center under the direction of David Salat, Ph.D., which will provide interns with the opportunity to learn about advanced structural and functional neuroimaging methods.

- Co-Directors: Regina McGlinchey Ph.D. and William Milberg, Ph.D., ABPP/cn.

Lippa, S.*, Fonda, J. R., Fortier, C. B., Amick, M. A., Kenna, A., Milberg, W. P., & McGlinchey, R. E. (In Press). Deployment-related psychological and behavioral conditions and their association with functional disability in OEF/OIF/OND Veterans. Journal of Traumatic Stress.

Robinson, M. E., Lindemer, E. R., Fonda, J. R., Milberg, W. P., McGlinchey, R. E., & Salat, D. H. (In Press). Close-range blast exposure is associated with altered functional connectivity in Veterans even without concussion symptoms at time of exposure. Human Brain Mapping.

- **VA Boston Healthcare System Neuroimaging Center (Jamaica Plain):** The VABHS Neuroimaging Center (or as it is known locally "The Neuroimaging for Veterans Center" or NERV) aims to elucidate the neural consequences of conditions affecting veterans from every cohort and generation served by the VA. Current research includes traumatic brain injury, posttraumatic stress disorder, aging, and mild cognitive impairment. The Center is equipped with a Siemens 3 Tesla MRI scanner with 32 Channel Head Coil capable of advanced structural and functional brain imaging. NERV is supported by an advanced computer infrastructure that is used for the quantitative analysis and storage of large neuroimaging datasets as well as a range of hardware and software for physiological monitoring and the presentation of auditory and visual stimuli for cognitive and sensorimotor studies of brain function. Center investigators are active across a diverse assortment of research projects including studies of anatomy, neurodegeneration, cognition, and emotion regulation in conditions affecting veterans. The center also supports an integrated Transcranial Magnetic Stimulation laboratory.
  - Faculty: David Salat, Ph.D., Elizabeth Leritz, Ph.D., Mike Esterman, Ph.D., Jasmeet Hayes, Ph.D., and Scott Hayes, Ph.D.

- **Boston Attention and Learning Laboratory (Jamaica Plain):** In the BALLAB, we study the cognitive and neural mechanisms of attention as well as the potential for enhancing attentional abilities through cognitive training. To gain insights from multiple perspectives, we perform behavioral, neuroimaging

(functional MRI), neurostimulation (TMS, tDCS) and cognitive training experiments in healthy subjects and disordered populations (i.e., hemispatial neglect, TBI, PTSD, prosopagnosia). The BALLAB works closely with the VA Research Neuroimaging Center, as well as the Translational Research Center for TBI and Stress Disorders (TRACTS). The lab has multiple research assistants and post-docs, and there are numerous opportunities for interns to develop their research interests in cognitive neuroscience and neurorehabilitation across a range of clinical populations with attentional impairments.

- Faculty: Joseph DeGutis, Ph.D. and Michael Esterman, Ph.D.

DeGutis, J., Chiu, C., Thai, M., Esterman, M., Milberg, W., & McGlinchey, R. (2016). Trauma Sequelae are Uniquely Associated with Components of Self-Reported Sleep Dysfunction in OEF/OIF/OND Veterans. Behavioral Sleep Medicine doi:10.1080/15402002.2016.1173550 pdf

Poole, V., Robinson, M., Singleton, O., DeGutis, J., Milberg, W., McGlinchey, R., Salat, D., & Esterman, M. (2016). Intrinsic functional connectivity predicts individual differences in distractibility. Neuropsychologia doi:10.1016/j.neuropsychologia.2016.04.023 pdf

DeGutis, J., Esterman, M., McCulloch, B., Rosenblatt, A., Milberg, W., & McGlinchey, R. (2015). Posttraumatic Psychological Symptoms are Associated with Reduced Inhibitory Control, not General Executive Dysfunction. (2015). Journal of International Neuropsychological Society, 21(5), 342-352.

Esterman, M., Liu, G., Okabe, H., Reagan, A., Thai, M., & DeGutis, J. (2015). Frontal eye field involvement in sustaining visual attention: Evidence from transcranial magnetic stimulation. Neuroimage doi:10.1016/j.neuroimage.2015.01.044 pdf

Fortenbaugh, F. C., DeGutis, J., Germine, L., Wilmer, J., Grosso, M., Russo, K., & Esterman, M. (2015). Sustained attention across the life span in a sample of 10,000: Dissociating ability and strategy. Psychological Science doi:10.1177/0956797615594896 pdf.

- **Center for Translational Cognitive Neuroscience (Jamaica Plain):** The CTCN studies memory with the goals of using cognitive neuroscience research to improve the lives of individuals with cognitive brain disorders. We also endeavor to build bridges between cognitive neuroscience research and

investigators using other research techniques, and educate clinicians and scientists in cognitive neuroscience and how it can be applied to brain disorders. Our research uses the techniques of experimental psychology and cognitive neuroscience to understand memory and memory distortions in patients with Alzheimer's disease, mild cognitive impairment, and brain trauma. Current projects include using music or strategies to enhance memory, using ERPs (event-related potentials) as a biomarker to detect and track disease progression, and using questionnaires to evaluate a care coordination intervention from the Alzheimer's Association. Lab members are all encouraged to attend weekly lab meetings on Wednesday afternoons, and to participate in ongoing studies. Opportunities exist for the motivated and/or experienced intern or fellow to lead a small project or write a review paper.

- Faculty: Andrew Budson, M.D., Maureen O'Connor, Ph.D., Michael Tat, Ph.D.