

Johns Hopkins University School of Medicine
ADVANCED SPECIALTY TRAINING PROGRAM (ASTP) Application

Program name: “*Neuroplastic & Reconstructive Surgery*”

Co-sponsored by: *Departments of Plastic/Reconstructive Surgery and Neurosurgery*

Faculty Program Directors:

Chad Gordon, DO, FACS

Assistant Professor of Plastic Surgery and Neurosurgery
Johns Hopkins School of Medicine
Department of Plastic and Reconstructive Surgery

Co-Director, Multidisciplinary Adult Cranioplasty Center (MACC)
Department of Neurosurgery

Judy Huang, MD

Professor of Neurosurgery
Johns Hopkins School of Medicine
Department of Neurosurgery

Chairman, Department of Neurosurgery
Johns Hopkins Bayview Medical Center

Co-Director, Multidisciplinary Adult Cranioplasty Center (MACC)
Department of Neurosurgery

Number of trainees anticipated: One fellow per year

Criteria for acceptance of trainees: Must have completed an ACGME-approved residency in either plastic surgery, neurosurgery, or head and neck/otolaryngology and be deemed “board-eligible” in their respective field.

Length of fellowship program: One-year fellowship as an “Advanced Specialty Training Program” (ASTP) appointed through the Johns Hopkins University School of Medicine

Physical location of clinical and research training:

- Length of the educational program is a 1-year clinical fellowship which will take place between the The Johns Hopkins Hospital, Johns Hopkins Bayview Medical Center, Johns Hopkins University Applied Physics Laboratory, and Walter Reed National Military Medical Center with integrated research requirement focusing on all aspects of computer-assisted technologies in neuro-cranial reconstruction including cranioplasty and craniomaxillofacial transplantation.

Program Description:

The Johns Hopkins' *Neuroplastic and Reconstructive Surgery Fellowship* will seek to train the future leaders in Adult Craniomaxillofacial and Neuro-cranial reconstruction, with an additional research focus on “computer-assisted surgery” and “robot-assisted surgery” technology in collaboration with the Johns Hopkins University Applied Physics Laboratory (JHU APL) and the Walter Reed National Military Medical Center (WRNMMC).

Clinical experience will be centered around the MACC and all related cases performed at both the Johns Hopkins Hospital and Johns Hopkins Bayview Medical Center. The fellow will work alongside craniofacial plastic surgeon, Dr. Chad Gordon, and neurosurgeon, Dr. Judy Huang. In no way will the resident education be impeded in either of the surgical residencies, especially since most neuroplastic and reconstructive cases require multiple residents and fellows for adequate coverage. In addition, there are 13 additional full-time neurosurgeons collaborating with the MACC, which make this a high-volume fellowship unlike any other center of its kind. Similarly, the fellow will work alongside various other surgical and medical specialists across various related fields including neurology, hematology, infectious disease, oculoplastics, physical medicine and rehabilitation, medical neuro-oncology, radiation neuro-oncology, and head and neck surgery/otolaryngology [website – www.hopkinsmedicine.org/MACC].

Dr. Mehran Armand will be the “program site (off campus) – laboratory research director” for all neurosurgical and craniofacial-related, *non-clinical* research conducted in collaboration with the JHU APL. He is an endowed professor and principal staff member at the JHU APL and has over 20 years experienced in developing novel “computer-assisted” and “robot-assisted” technologies in orthopedic surgery, and at the same time, has been working alongside Dr. Gordon since 2011 on many grant-funded projects.

Dr. Peter Liacouras will be the “program site (off campus) – laboratory research director” for all neurosurgical and craniofacial-related, *non-clinical* research conducted in collaboration with the WRNMMC. He is the director of the 3D Medical Applications Laboratory at Walter Reed. He has over 10 years experience in developing novel 3D applications and surgical guides in craniofacial surgery, and has been working alongside Dr. Gordon since 2011 on many grant-funded projects.

The fellowship includes in-depth study of disorders of the soft and hard craniofacial and extradural neural tissues of the cranium, orbit and facial skeleton - including traumatic, oncologic, congenital, functional, neurofibromatosis and acquired neurological deformities/diseases. Fellows trained in *Neuroplastic and Reconstructive Surgery* at our institution will be able to manage all Craniomaxillofacial anomalies as described above in the adult patient population, and will have the pertinent training to pursue an academic surgical career focused on the field of their choice related to Neuroplastic and

Reconstructive Surgery – combining the specialties of Craniofacial Plastic Surgery and Neurosurgery. To our knowledge, this will be the first fellowship of its kind in the U.S.

Activities requiring faculty supervision:

1. Comprehensive experience with the preoperative evaluation, treatment planning, operative treatment, and postoperative management of patients with congenital and acquired craniomaxillofacial soft tissue and skeletal deformities.
2. Comprehensive experience with the preoperative evaluation, treatment planning, operative treatment, and postoperative management of patients with Neuro-cranial defects resulting from trauma, neuro-oncologic disease, and/or neurofibromatosis.
3. Comprehensive weekly involvement with a large Multidisciplinary Adult Cranioplasty Center (MACC) team, with formal exposure to wide spectrum of team members and their respective roles in various specialties including neurology, hematology, infectious disease, radiation neuro-oncology, medical neuro-oncology, oculoplastics, physical medicine and rehabilitation, and head and neck surgery/otolaryngology.
4. Weekly outpatient clinic experience in the preoperative evaluation and postoperative management of adult craniomaxillofacial trauma.
5. Weekly outpatient clinic experience in the preoperative evaluation and postoperative management of aesthetic facial surgery patients.
6. Comprehensive experience with craniomaxillofacial surgery requiring fellow perform cephalometric analysis, fabrication of dental models and orthognathic splints, surgical treatment planning, and orthognathic surgery.
7. Comprehensive experience with the reconstructive management of post-ablative defects from cranial and/or brain-related malignancies involving the neuro-cranial region with loco-regional flaps, free tissue transfer, split calvarial bone grafting, and alloplastic biomaterial/custom implant techniques.
8. Comprehensive experience with adult craniomaxillofacial trauma, both acute and post-traumatic deformity reconstruction.
9. Comprehensive experience in neuro-vascular craniofacial anomalies, both acute and post-traumatic deformity reconstruction.
10. Formal weekly conference with the program directors to review assigned readings in core curriculum topics relating to relevant adult craniofacial surgery and neurosurgical topics with concomitant monthly journal clubs.

Clinical Goals and Objectives

- To experience a broad education in the art and science of Neuro-craniofacial surgery which is now being termed “*Neuroplastic and Reconstructive Surgery*”
- To experience progressive senior surgical responsibility in the essential phases of patient care: preoperative evaluation, therapeutic decision making, operative experience, and postoperative management
- Participate in the diagnosis, planning, operative treatment, and postoperative care of craniofacial diagnoses including: Cranioplasty, craniofacial exposures in cranial base surgery, Congenital and traumatic orbital dysmorphologies, craniofacial clefting and orbital hypertelorism, post-traumatic craniofacial deformities, and

- aesthetic facial surgery
- Gain experience in the multi-disciplinary planning and management of adult cranioplasty and craniofacial patients via an active role in the Johns Hopkins Multidisciplinary Adult Cranioplasty Center (MACC)
 - Gain experience in the reconstructive management of defects post-ablative surgery for malignancies of the Neuro-craniofacial region from both the perspective of craniofacial surgery and neurosurgery

Didactic Goals and Objectives

- Demonstrate knowledge of normal and abnormal embryology and fetal development of the brain, cranium, face, head and neck
- Demonstrate ability to interpret radiological studies including dental radiographs, cephalometric analysis, CT and MRI neuro-craniofacial imaging modalities
- Demonstrate expertise in the construction orthognathic splints, and their use in craniofacial and maxillofacial surgery
- Appreciate the standards of cephalometric normalcy as they relate to the face and cranium
- Demonstrate an understanding of craniofacial bone healing, including primary bone healing, malunion, nonunion, osteomyelitis, and the physiology and methods of split-calvarial bone grafting
- Demonstrate an understanding of the use of alloplastic biomaterials and tissue engineering in craniofacial reconstruction
- Demonstrate knowledge of congenital, developmental, and secondary deformities of the brain, cranium, head and face

Research Opportunities

One clinical research project leading to one podium presentation and peer-reviewed journal publication is expected per fellow per year for publication in either top-tier craniofacial plastic surgery and/or neurosurgery journals. Significant basic and translational research opportunities will be made available and strongly encouraged via our MACC's ongoing collaboration with the Walter Reed National Military Medical Center (Bethesda, MD) under Dr. Peter Liacouras and the Johns Hopkins University Applied Physics Laboratory (Laurel, MD) under Dr. Merhan Armand.