State of the Neurosurgery Research & Education Foundation

June 2020
Dear Friends of the NREF,

This year, we celebrate 40 years of the Neurosurgery Research & Education Foundation (NREF). We reach this milestone at a time of crisis for our neurosurgery community. Despite these trying times, the NREF carries the torch for basic science and clinical research, as well as lifelong education, to foster improved outcomes for our patients with neurosurgical diseases.

Although the future is always unknown, recent global events have highlighted this is a time of opportunity and it remains crucial that we wisely invest in our profession. The state of the NREF is strong and our commitment to the preservation and optimization of our profession is steadfast.

The NREF has been hard at work. That entails resident and fellowship education, basic science grants and clinical outcomes analysis with registry databases. You will see in the accompanying stewardship communication what the NREF has accomplished in recent years. Please take the time to read it, digest our joint accomplishments and provide feedback to us on how we are doing and how we might improve.

On a personal note, I would like to THANK YOU for both your personal efforts as well as your financial investment in neurosurgery. I have never asked for a GIFT to the NREF... but have requested thoughtful consideration of an INVESTMENT in OUR PROFESSION. When you read this report, I feel confident you will see the positive return on your investment.

Neurosurgery is a calling. We are a band of brothers and sisters, tied together by a common rigorous training background of many years and the experience of treating patients with life-altering pathologies.

The NREF’s accomplishments are only achieved with team spirit and commitment. YOU – the private practitioners, the academic clinicians and basic scientists, the fellows and residents – have joined forces to elevate our chosen profession.

Be proud, but not complacent, with our accomplishments. We have done much ... there is much more to do.

Please peruse this over a cup of coffee, tea or a stronger libation. Take the time to observe what a few neurosurgeons can accomplish for our specialty. Believe in what the future holds.

It has been an honor to serve as the chair of the NREF the past few years. Griff Harsh, MD, FAANS; Troy Tippett, MD, FAANS(L), Jon Robertson, MD, FAANS, and others have paved the way. We stand on their shoulders. I am proud to pass the torch to Mike Groff, MD, FAANS, who has assumed the role of NREF chair.

We have assembled an outstanding team and organizational structure to carry the NREF to the next level. However, the ongoing success of the NREF depends upon the contributions of each and every one of us.

We want to hear from you. All suggestions, critiques and comments are welcome. Feel free to send your comments or suggestions directly to me, to Dr. Groff or to our Chief Development Officer, Kathryn Dattomo at kad@nref.org.

Thank you for this opportunity,

Regis Haid, MD, FAANS
AANS President-Elect
Immediate Past NREF Chair

The Way Forward ...with NREF

The NREF supports the community of neurosurgery in the broadest sense. The culture of giving that we have built together is an investment in our future. I extend my personal thanks for each and every contribution. Your support ensures that the new normal will continue to be one that puts neurosurgical patients first and foremost.

Thank you,

Michael W. Groff, MD, FAANS
NREF Chair
Your Investment in the NREF Creates Opportunities

This year, YOU have helped the NREF support:

- 1 William P. Van Wagenen Fellowship
- 1 Resident/Fellow Education Course
- 2 Joint CV Section Traveling Fellowships
- 11 Research Fellowship Grants and Young Clinician Investigator Awards
- 20 Clinical Fellowship Grants
- 20 Medical Students Summer Research Fellowships
- 31 Resident/Fellow Education Course Participants

NREF by the Numbers

- 6 Joint CV Section Traveling Fellowships
- 88 Resident/Fellow Education Courses
- 129 Clinical Fellowship Grants
- 256 Medical Student Summer Research Fellowships
- 257 Research Fellowship Grants and Young Clinician Investigator Awards
- 2,020 Research/Fellow Education Course Participants
- Nearly $30 million invested in neurosurgery research and education
$1,783,062 invested in research, fellowships and education in FY19

- **41%** Clinical Fellowship Grants
- **27%** Resident Courses
- **28%** Research Grants and Young Clinician Investigator Awards
- **4%** Medical Student Summer Research Fellowships
Research Made Possible With Your Support

Research Fellowship Grants / Young Clinician Investigator Awards (RG-YCI)

The NREF provides funding for studies in basic, translational and patient-oriented clinical research annually for North American investigators.

11 RG-YCI funded for the 2020-2021 academic year

This year’s grants are funded with NREF funds combined with generous support from the Bagan Family Foundation, along with the AANS/CNS Section on Neurotrauma & Critical Care, the Andrew T. Parsa Honor Your Mentor Fund, the Academy of Neurological Surgeons, the AANS/CNS Section on Tumors, the AANS/CNS Cerebrovascular Section/Dr. Arvind Ahuja, the AANS/CNS Section on Pediatric Neurological Surgery and Medtronic.

The NREF is a fantastic mechanism to foster young neurosurgeon-scientists in their career to develop the initial phases of their research program, and I have been very fortunate to be a recipient of an NREF research fellowship award during my residency. As a neurosurgeon-physician scientist, having the support of mechanisms and foundations such as the NREF are imperative to our ability to help conduct research to bridge the gap between the basic, translational and clinical neurosciences with our neurosurgical practice. I am extremely grateful for the support of the NREF to help foster my career goals.

– Pablo Valdes Quevedo, MD, PhD
2017-18 B*CURED & NREF Research Fellowship Grant Recipient
Medical Student Summer Research Fellowship (MSSRF)

MSSRFs are awarded to medical students whose research projects are aimed at the better understanding, treatment and prevention of neurological disorders as well as improved patient care.

Since being named a recipient of the 2019 Medical Student Summer Research Fellowship, I have fully realized and solidified my goal of becoming a neurosurgeon clinician-scientist. The award gave me an opportunity to learn skills that will contribute towards a career in neurosurgery. I would like to thank you personally for your generosity. Without scholarship patrons willing to support medical education, students such as myself would be unable to realize careers as clinician-scientists.

– Ryan Sandarage, The University of British Columbia
2019 Medical Student Summer Research Fellowship Recipient

William P. Van Wagenen Fellowship (VW)

Ezequiel D. Goldschmidt, MD, PhD, is the recipient of the 2020-21 William P. Van Wagenen Fellowship. Dr. Goldschmidt, a resident in neurosurgery at University of Pittsburgh, will commence his Van Wagenen fellowship in July 2020.
Education Made Possible With Your Support

Clinical Fellowship Grants (CFG)

Each year, the NREF provides fellowship funding for basic and clinical neuroscience for neurosurgical programs in North America.

Nearly $1.3 million granted to support 20 CFGs at 15 institutions for the 2020-2021 academic year

2020-2021 CFG funding has been awarded to: Cedars-Sinai Medical Center, Memorial Sloan Kettering Cancer Center, Loyola University Medical Center, Northwestern University, Rush University Medical Center, Medical College of Wisconsin, University of California, San Francisco (UCSF), University of Michigan, Toronto Western Hospital/University Health Network, University of Louisville, University of Miami, Duke University, Johns Hopkins, University of Pittsburgh Physicians and Tulane University. Grants to support these fellowships are provided by DePuy Synthes, Globus Medical, Medtronic and NuVasive.

Through the NREF grant, I have completed one of the most comprehensive spine fellowships in the country. This fellowship has allowed me to continue my career in academic neurosurgery as an assistant professor of neurosurgery at Thomas Jefferson University in Philadelphia. With the completion of my fellowship, I am confident I am able to offer my patients treatment options that are the most up-to-date as well as best suited for their specific conditions.

– Ajit Jada, MD
2017-18 Post-residency Clinical Fellowship Recipient
AANS/CNS Cerebrovascular Section Traveling Fellowship

Congratulations to the 2020 AANS/CNS Cerebrovascular Traveling Fellowship Awardees, Andrew W. Grande, MD, FAANS, and Grahame C. Gould, MD, FAANS. These fellowships allow a practicing CAST-certified neurointerventionalist (of any specialty) to visit a high-volume cerebrovascular center to complete a one-week observership. Recipients are chosen by an AANS/CNS Cerebrovascular Section. The fellowship is supported by Medtronic and Microvention.

Resident Education Courses

The NREF offers neurosurgical residents free education courses to provide advanced training in areas that may not be covered within a neurosurgical residency program.

Residents attended the Spinal Deformity Course for Residents in February 2020

100% of participants would recommend the course with 94% rating the course excellent

Learning best practices from masters in the field was invaluable; such great faculty selection – really made the course stand out.

– 2020 Spinal Deformity Course Participant

The course was a terrific reminder of why I am pursuing a career in cerebrovascular neurosurgery. The lectures were engaging and the lab portion was excellent.

– 2019 Endovascular and Vascular Techniques Course for Senior Residents Course Participant

Due to COVID-19 pandemic, the NREF has canceled the live, hands-on courses planned through the end of the year. We remain committed to supporting neurosurgeons in training with online resources.
Free Online Resources for Residents

The AANS offers more than 50 hours of didactic content, designed specifically for in-training neurosurgeons, for free in an online series of past AANS/NREF Resident Education Courses. Industry-sponsored webinars are also available to view online, at no cost.

Rhoton Collection®

The Rhoton Collection® is an online repository of Dr. Rhoton’s teaching materials in both 2-D and 3-D formats that highlight anatomical structures in an interactive atlas and videos.

Thanks to YOU, the State of the NREF is Strong!

Total Assets Under Management
Cushing Circle of Giving

Membership in this premier recognition society is open to all donors who demonstrate a long-term commitment to advancing neurosurgery with a contribution to the NREF of $25,000 or more. The Cushing Circle of Giving represents over $6 million in cumulative donations.
The NREF is pleased to recognize the Cushing Circle of Giving Donors:

* Denotes deceased donor.

PLATINUM: $100,000 and above

- Arvind Ahuja, MD, FAANS
- Merwyn and Carol Bagan
- Mrs. E. Laurie Bittner
- Dr. and Mrs. John Guarnaschelli
- Dr. and Mrs. Regis W. Haid, Jr.
- Robert F. Heary, MD, FAANS
- Lester A. Mount, MD*
- Dr. and Mrs. Russel H. Patterson Jr.
- Dr. and Mrs. Albert L.* Rhoton Jr.

GOLD: $75,000-$99,999

- John L. D. Atkinson, MD, FAANS
- Timir Banerjee, MD, FAANS
- Hans C. Coester, MD, FAANS
- Griffith R. Harsh IV, MD, FAANS and Ms. Margaret C. Whitman

SILVER: $50,000-$74,999

- Frederick G. Barker II, MD, FAANS
- Charles L. Branch, Jr., MD, FAANS
- Aaron A. Cohen-Gadol, MD, FAANS
- Kai-Ming Fu, MD, PhD, FAANS
- Ricardo Alexandre Hanel, MD, PhD, IFAANS
- Drs. Robert E. and Kimberly S. Harbaugh
- Theodore R. Jacobs, MD, FAANS
- Benjamin B. LeCompte III, MD, FAANS(L)
- Praveen V. Mummaneni, MD, FAANS
- Jon H. Robertson, MD, FAANS
- Ann R. Stroink, MD, CPE, FAANS
- Drs. Shelly D. Timmons and Russell A. Carter
- Ms. Virginia Van Sant Reeves*
- Michael Y. Wang, MD, FAANS
- Seth M. Weingarten, MD, FAANS(L)
BRONZE: $25,000-$49,999

P. David Adelson, MD, FAANS
Owoicho Adogwa, MD, MPH
Nitin Agarwal, MD
Ronald I. Apfelbaum, MD, FAANS(L)
Adam S. Arthur, MD, MPH, FAANS
Anthony Asher, MD., FAANS
Dr. and Mrs. Nicholas M. Barbaro
H. Hunt Batjer, MD, FAANS
James R. Bean, MD, FAANS(L)
Mitchel S. Berger, MD, FAANS
Dr. and Mrs. Gary Bloomgarden
Jeffrey P. Blount, MD, FAAP, FAANS
Dr. and Mrs. Frederick A. Boop
Dr. and Mrs. Warren C. Boop Jr.
Jeffrey N. Bruce, MD, FAANS
Peter W. Carmel, MD, FAANS
John R. Caruso, MD, FAANS
William L. Caton III, MD, FAANS*
Michael A. Chabraja, Esq.
Ali Chahlavi, MD, FAANS
Jefferson W. Chen, MD, PhD, FAANS
Joseph C. T. Chen, MD, PhD, FAANS
Joseph S. Cheng, MD, MS, FAANS
Lawrence S. Chin, MD, FAANS
Ennio Antonio Chiocca, MD, PhD, FAANS
Kevin M. Cockcroft, MD, FAANS
E. Sander Connolly, Jr., MD, FAANS
Mrs. Elise Lapeyre Connolly
Dr. and Mrs. William T. Couldwell
Ralph G. Dacey, Jr., MD, FAANS
John D. Davis, MD, FAANS
H. Gordon Deen, Jr., MD, FAANS
Stewart B. Dunsker, MD, FAANS(L)
J. Flagg Flanagan
Jeremy L. Fogelson, MD, FAANS
Drs. Kevin T. and Lynn M. Foley
Allan H. Friedman, MD, FAANS
Ziya L. Gokaslan, MD, FAANS
John G. Golfinos, MD, FAANS
M. Sean Grady, MD, FAANS
Andrew W. Grande, MD, FAANS
Michael W. Groff, MD, FAANS
Dr. and Mrs. Robert G. Grossman
Dr. and Mrs. Robert L. Grubb Jr.
Mary K. Gumerlock, MD, FAANS
Stephen J. Haines, MD, FAANS(L)
Carl B. Heilman, MD, FAANS
Martin M. Henegar, MD, FAANS
Matthew A. Howard III, MD, FAANS
Jason H. Huang, MD, FAANS
N. Ross Jenkins, MD, FAANS
Michael G. Kaiser, MD, FAANS
Adam S. Kanter, MD, FAANS
A. Bernhard Kliefoth III, MD, FAANS(L)
John Joseph Knightly, MD, FAANS
Mark J. Kubala, MD, FAANS(L)*
Charles Kuntz, MD, FAANS*
Shekar N. Kurpad, MD, PhD, FAANS
Adrian W. Laxton, MD, FAANS
Dr. and Mrs. Robert Levinthal
Michael J. Link, MD, FAANS
Mark E. Linsky, MD, FAANS
James J. Lynch, MD, FAANS
Robert L. Martuza, MD, FAANS(L)
Catherine Anne Mazzola, MD, FAANS
Paul C. McCormick, MD, FAANS
Mark R. McLaughlin, MD, FAC, FAANS
Fredric B. Meyer, MD, FAANS
L. Madison Michael II, MD, FAANS
Jacques J. Morales, MD, FAANS
Hiroshi Nakagawa, MD, IFAANS
Anil Nanda, MD, MPH, FAANS
Chris J. Neal, MD, FAANS
Eric W. Nottmeier, MD, FAANS
Dr. and Mrs. Herbert* Oestreich
D. Ryan Ormond, MD
Mr. Joseph and Dr. Susan Pannullo
Rob G. Parrish, MD, PhD, FAANS
David Peterson
Jeremy Todd Phelps, MD, MBA, FAANS
Joseph M. Piepmeier, MD, FAANS
Stephen M. Pirris, MD, FAANS
Bruce E. Pollock, MD, FAANS
A. John Popp and Margaret M. Vosburgh
Ashutosh Ashok Pradhan, MD, FAANS
Donald O. Quest, MD, FAANS(L)
Dr. and Mrs. Robert A. Ratcheson
John Kevin Ratliff, MD, FAANS
Eric Loren Rhoton, MD, FAANS
James Thomas Robertson, MD, FAANS(L)*
Kaplan Rosenow Family Foundation/
Joshua M. Rosenow, MD, FAANS
Gail L. Rosseau, MD, FAANS
Dr. and Mrs. Richard L.* Rovit
James T. Rutka, MD, PhD, FAANS
Timothy and Shonda Ryken
Raymond Sawaya, MD, FAANS
Dr. and Mrs. John F.* Schuhmacher
Michael Schuler, MD, FAANS
Edward L. Seljeskog, MD, PhD, FAANS(L)
Dr. and Mrs. Warren R. Selman
Christopher I. Shaffrey, MD, FAANS
Mark Edwin Shaffrey, MD, FAANS
Michael B. Shannon, MD, FAANS
J. Marc Simard, MD, PhD, FAANS
Walavan Sivakumar, MD
Konstantin V. Slavin, MD, FAANS
Justin S. Smith, MD, PhD, FAANS
Robert A. Solomon, MD, FAANS
Volker K. H. Sonntag, MD, FAANS(L)
Jeffrey M. Sorenson, MD, FAANS
Drs. Mark A. Spatola and Mihaela Ionescu
Robert F. Spetzler, MD, FAANS(L)
Gary K. Steinberg, MD, PhD, FAANS
Troy M. Tippett, MD, FAANS(L)
Roland A. Torres, MD, FAANS
Luis Manuel Tumialan, MD, FAANS
Alex B. Valadka, MD, FAANS
Craig Andrew Van Der Veer, MD, FAANS
G. Edward Vates, MD, PhD, FAANS
Marjorie C. Wang, MD, MPH, FAANS
Clarence B. Watridge, MD, FAANS(L)
Martin H. Weiss, MD, FAANS(L)
Robert E. Wharen, Jr., MD, FAANS
David Whelan
John A. Wilson, MD, FAANS
Stacey C. Wolfe, MD, FAANS
Ahmet Yildizhan, MD, IFAANS
Gregory J. Zipfel, MD, FAANS
Ahmet Yildizhan, MD, IFAANS
Gregory J. Zipfel, MD, FAANS
The following institutions support the Cushing Circle of Giving:

**PLATINUM: $100,000 and above**
- American Academy of Neurological Surgery
- American Brain Tumor Association
- Columbia University Medical Center
- Haas Trust
- Massachusetts General Hospital Department of Neurosurgery
- Mayfield Clinic
- Semmes-Murphey Clinic/University of Tennessee

**GOLD: $75,000-$99,999**
- American College of Surgeons
- University of Virginia Department of Neurosurgery
- UPMC-Department of Neurological Surgery

**SILVER: $50,000-$74,999**
- American Society for Stereotactic & Functional Neurosurgery
- Barrow Neurological Institute and Barrow Brain and Spine
- Brigham and Women’s Hospital Department of Neurosurgery
- CNSA Partners
- Southern Neurosurgical Society
- SUNY Syracuse Neurosurgical Residency

**BRONZE: $25,000-$49,999**
- California Association of Neurological Surgeons
- Cleveland Clinic
- Congress of Neurological Surgeons
- Section of Neurosurgery at Dartmouth-Hitchcock
- Henry Ford Hospital
- University of Pennsylvania Department of Neurosurgery
- Keller Foundation / Mrs. Ruby C. Keller
- Louisiana Neurosurgical Society
- Mayo Clinic-Department of Neurologic Surgery
- Mayo Clinic-Florida Department of Neurosurgery
- Neurosurgical Society of America
- New England Neurosurgical Society
- Pennsylvania State University Department of Neurosurgery
- Pennsylvania Neurosurgical Society
- Robert Watson Society
- Rocky Mountain Neurosurgical Society
- Rush University Medical Center Department of Neurosurgery
- Tennessee Neurosurgical Society
- Toronto Western Hospital
- University of Alabama Neurosurgical Residency
- University of California-San Francisco Neurosurgical Residency
- University of Utah Department of Neurosurgery
- University of North Carolina Department of Neurosurgery
- The University of Oklahoma Health Sciences Center - Dept of Neurological Surgery
- UT Southwestern Department of Neurological Surgery Faculty
- Weill Cornell Neurological Surgery Department, Dr. Philip Stieg, Chairman
- Western Neurosurgical Society
Young Neurosurgeons Circle of Giving

The Young Neurosurgeons Circle of Giving recognizes residents who have made a commitment — early in their careers — to advance the specialty through support of neurosurgical research and education by donating to the NREF.

Honor Your Mentor (HYM) Funds

Honor Your Mentor Funds recognize neurosurgical luminaries, both past and present. Information about the specific purpose of each HYM fund is posted on the NREF website.

HYM Funds/Donations

HYM Funds have provided over $300K in funding for projects and awards.

HYM Pledges/Donations Received

HYM Pledges/Donations Received

<table>
<thead>
<tr>
<th>Year</th>
<th>HYM Donations Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>2016</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>2017</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>2018</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>2019</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>2020</td>
<td>$6,000,000</td>
</tr>
</tbody>
</table>
Pinnacle Partners in Neurosurgery

The NREF gratefully acknowledges the following corporate supporters for their commitment to advance neurosurgery:

**Principal Partner** Medtronic

**Major Partner** DePuy Synthes

**Supporting Partners** Brainlab, Globus Medical, Leica Microsystems, Varian Medical Systems and ZEISS

**2020-2021 NREF Board of Directors**

**Michael W. Groff, MD, FAANS**
Chair

**Charles L. Branch, Jr., MD, FAANS**
Vice Chair and Fellowship Committee Chair

**Anthony L. Asher, MD, FAANS**
Treasurer

**Gregory J. Zipfel, MD, FAANS**
Secretary and Research Committee Vice Chair

**Adam S. Arthur, MD, MPH, FAANS**
Education Committee Chair

**Frederick G. Barker II, MD, FAANS**
SNS Representative

**E. Antonio Chiocca, MD, PhD, FAANS**
Research Committee Chair

**J. Flagg Flanagan**
Public Member

**Regis W. Haid, Jr., MD, FAANS**
AANS President-Elect

**John Joseph Knightly, MD, FAANS**
NPA Chair

**Linda M. Liau, MD, PhD, MBA, FAANS**
SNS Representative

**Russell R. Lonser, MD, FAANS**
Academy Representative

**Angela Richardson, MD**
YNC Liaison

**Daniel L. Reuvers**
Public Member

**Jon H. Robertson, MD, FAANS**
NREF Board Member Emeritus

**James T. Rutka, MD, PhD, FAANS**
JNS Editor in Chief

**Michael Y. Wang, MD, FAANS**
Development Committee Chair

**John A. Wilson, MD, FAANS**
AANS President

The Neurosurgery Research & Education Foundation (NREF) is a not-for-profit, 501(c)(3) organization created in 1980 by the American Association of Neurological Surgeons (AANS) to support research and education efforts that enhance and confirm the critical role neurosurgeons play in improving lives. For more information about the NREF, visit www.nref.org.