



CHILD NEUROLOGY SOCIETY



Association of
University Professors
of Neurology



AMERICAN ACADEMY OF
NEUROLOGY®

2018 Combining Clinical and Research Careers (CCRC) Symposium for Medical Students

Faculty:

- Course Director – Allan Levey MD, PhD, Emory University
- Co-Director – Rebecca Gottesman, MD, PhD, Johns Hopkins University
- Walter J. Koroshetz, MD, NINDS Director
- Stephen J. Korn, PhD, NINDS Training Programs Director

Invited Speaker

- Kareem A. Zaghloul, M.D., Ph.D., NINDS, NIH

Senior Faculty Mentors:

- Jaffar Khan, M.D., FAAN, Emory University
- Natalia Rost, M.D., MPH, FAAN, FAHA, Massachusetts General Hospital
- Kevin Ess, MD, PhD, Vanderbilt University
- Nina F. Schor, MD, PhD, NINDS, NIH, CNS

Junior Faculty Mentors:

- Adrienne Boire, M.D., Ph.D., Memorial Sloan Kettering Cancer Center
- Jessica Rexach, M.D., Ph.D., University of California, Los Angeles (UCLA)
- Albert Gus Davis, M.D., Ph.D., Washington University
- Srikanth Rangaraju, MBBS, Emory University

Course Description:

The 2018 CCRC course, held at the NIH, focused on MD and MD/PhD students nearing completion of their medical school training. A tour of the clinical research facilities at NINDS was provided by several neurology fellows working at the NIH, demonstrating the unique attributes of the intramural research program and outstanding facilities for research. Panels of course faculty representing outstanding junior and senior physician scientists provided an overview of their careers pathways and careers in child and adult neurology and in neurosurgery. There was also a presentation of funding mechanisms for training in residency (R25) and K awards (K08/K12 for peds neuro and neurosurgery/K23). Extensive panel discussions and question answer periods addressed issues around mentoring and residency selection pertinent to the successful career development of physician scientists. The challenges of work life balance were discussed. Small group mentoring allowed follow up discussions for more personal issues.

Learning Objectives:

- Educate medical students with significant research experience about career paths and opportunities for successfully combining careers in research and clinical neuroscience.

- Educate medical students with significant research experience about funding sources and strategies for obtaining training and research support during residency and fellowship periods.
- Introduce students to the unique clinical and research environment at the NIH and meet with NIH officials including the NINDS director and training program director.
- Provide an opportunity for students to meet a variety of junior and senior academicians who have successfully combined clinical and research careers in neuroscience, including pediatric neurology, adult neurology, and neurosurgery.
- Provide an opportunity for students to network with other students, fellows, junior and senior faculty to establish a social network that will allow ongoing communication.

Program Funding:

This course is sponsored by the National Institute of Neurological Disorders and Stroke (NINDS), Association of University Professors of Neurology (AUPN), American Neurological Association (ANA), American Academy of Neurology (AAN) and Child Neurology Society (CNS).

Summary:

The course included the follow components and activities.

Day 1

1. NIH Campus Tour. The students were given an overview of the unique environment of the NIH, including types of patients hospitalized for research purposes. They met with several neurology clinical fellows who provided tours of several labs including drug development, the metabolic chamber facility, 7T imaging, MEG, and TMS, with discussions about types of each of these research applications and approaches for clinical neuroscience.
2. Junior Faculty Panel. NINDS Director Dr. Koroshetz moderated this panel, discussing career development pathways for each of the junior faculty and highlighting the various options.
3. Senior Faculty Panel. NINDS Deputy Director and Pediatric Neurologist Dr. Nina Schor moderated this panel, discussing the various motivations and many perspectives about key issues necessary for a successful career.
4. Keynote speaker. Dr. Kareem A. Zaghloul gave an outstanding presentation about his career path leading to his position as a successful neurosurgeon and scientist. As in years past, some students are potentially interested in careers in neurosurgery so this provided an exceptional opportunity for them to learn about the unique challenges and aspects of this specialty.

Day 2

5. Opportunities and Accomplishments in Basic and Clinical Neuroscience research. Drs. Levey and Gottesman led presentations highlighting pioneering research advances made by neurologists and their translation of these discoveries into clinic medicine. Audience participation enhanced the discussion with others highlighting their favorite examples.
6. Funding and mentorship issues. Dr. Stephen Korn, Director of the Office of NINDS Training, gave an outstanding presentation that provided an overview of the funding mechanisms available in residency, fellowship and early faculty transitions. Key responsibilities for successful mentor – mentee relationships were discussed.
7. Mentoring sessions. Small groups of students met with 2 faculty to have more in depth and personalized discussions about their own needs, questions, and specific opportunities. The groups were organized thematically so that students career interests were aligned with the faculty expertise as child neurologists, adult neurologists, or neurosurgery.

Both Days

8. **Networking.** An important goal and outcome of the course was the opportunity for students to network with each other, fellows, junior faculty, senior faculty, and NINDS leadership. This year the course included significantly more time for informal interactions as a result of feedback from previous attendees. This include breakfast, lunch, and dinner on both days as well as receptions both evenings allowing informal discussions.

Evaluations:

The course evaluation was completed by 39/49 student attendees and 4/9 mentors. Overall, the course received positive reviews with a majority of the questions receiving a 5/5 score.

NIH Campus Tour

Overall, the students enjoyed the tour of the NIH campus, which received a 4.5/5 rating. Students were talking about the tour amongst each other and faculty/staff throughout the entire two-day symposium, commenting on how much they appreciated the rare opportunity to see the campus. A few comments for improvements included: having 6 tour groups instead of 3, providing further explanations of research done at the NIH, and having the tour later in the conference instead of right at the beginning.

Panel Discussion with Junior Faculty

The panel discussion with junior faculty was well received with students requesting more time for discussion. Students also appreciated hearing realistic stories of the successes and challenges the junior faculty faced in getting to where they are today. A suggested improvement was having faculty without a PhD present on the panel. Some additional topics students suggest be covered in future junior faculty panels include: selection of mentors & research topics, electives, and challenges they faced and how they overcame them.

Panel Discussion with Senior Faculty

The Senior Faculty Panel Discussion was well received with ratings of nearly all fives. A suggested improvement would be to reduce the number of faculty on the panel to allow more time for open discussion. Some suggested topics for future meetings included: discussing options for sub-specialty training, combining clinical and research fellowships, more discussion on challenges they faced and how they overcame them, and what to look for in a good mentor and how to find them.

Presentation by Dr. Kareem A. Zaghloul about his Career Path into Science and Neurosurgery

Students found it valuable to hear from a neurosurgeon's perspective and were reassured that being a clinician-scientist is a viable and thriving career path. One individual suggested having the lecture done by a practicing clinician rather than surgeon, but all other comments and reviews were positive.

Presentation by Dr. Allan Levey on Opportunities and Accomplishments in Basic Research

This presentation was well received with nearly all rankings being fours and fives. Students found the presentation important and/or interesting to hear about how past fundamental basic research has been translated into clinical applicability. One student commented that the most valuable part of this presentation was hearing Leigh Hochberg's story of "failures".

Presentation by Dr. Rebecca Gottesman on Opportunities and Accomplishments in Clinical Research

Students found this presentation valuable and felt that Rebecca was engaging and easy to understand. They also found it important and/or interesting to hear about how past fundamental clinical research has been translated into clinical applicability. One suggestion for future presentations was to discuss ways to transition into clinical research during residency and additional challenges of doing this kind of work.

Residency Discussion with Dr. Jaffar Khan and Junior Faculty

Students felt that the topics covered were relevant and important to them, and many felt this was the best presentation of the entire symposium. The only suggested improvement was to have some non-PhD individuals on the panel. Some suggested topics for future meetings included: interviewing strategies for learning about research experiences, alternative career pathways for physician scientists outside of academia, and the role of clinician-scientists in the "translational" part of medicine.

Presentation by Dr. Korn on Funding and Mentorship Issues

Based on the evaluations, Dr. Korn was engaging and students found his presentation very valuable with nearly all ratings being fours and fives. Students were happy to hear that the NIH is very supportive of physician scientists and demonstrate it with their generous funding opportunities. Many students found this presentation the single most valuable item in the course. A suggestion for future courses was to provide a timeline to help med students better visualize and plan during which period of their training should they apply for certain awards.

Small Group Breakout Session

All students gave the breakout session a rating fours and fives. They felt comfortable asking questions and that the mentors made an effort to answer questions honestly and completely. They also felt the mentors provided encouragement for each student's interest in a career as a clinician-scientist.

Networking Meals

Two networking breakfasts, two networking lunches and one networking dinner were held during the symposium. Overall, these received positive reviews from students who stated they greatly appreciated having the time to network amongst peers and mentors. Though, faculty did try to rotate between tables for each meal, it was suggested having more rotation between mentors and students.

Overall

We asked the students overall did they feel that the CCRC course increased the likelihood of them continuing on the path to a career combining clinical and research activities? All students who responded felt that this course did increase the likelihood of them pursuing a career as a clinician scientist. Nearly all students left the conference feeling that they had a better understanding of the grant pathways. Many left feeling that they gained confidence in understanding how to choose a residency.

Personal Statements:

We offered students the option to write a statement regarding the value of the CCRC course. A total of 37 individuals replied, and a few of the comments are listed below.

1. The value of the CCRC is the mentorship and sponsor ship of future clinician scientists. Not only does this program cater to MD/PhD students on the path but it provides necessary

information for medical students, residents, etc. that would otherwise not have access to this information. The value is not only taken from personal experience but included data showing the success rates of those applying and receiving funding as well as predictors of future success.

2. As the NIH is aware, the training of physician-scientists is quite long and demanding, particularly in Neurology and Neuroscience. This CCRC course was a wonderful, engaging, and helpful training opportunity to encourage and guide medical students to pursue this arduous yet rewarding path. Throughout my training, it is sometimes hard to see the bigger picture and the delayed gratification of developing new research tools, pioneering understanding in the lab, and delivering compassionate clinical care for such debilitating Neurological diseases. This program provided the resources and platform to inspire and guide burgeoning physician scientists by providing invaluable mentorship, panel discussions, and opportunities to network with future colleagues, junior faculty members who are starting to run their lab, and senior faculty members who have a breadth of wisdom. I came away with a clearer, more tangible picture of how my career could be and felt like I could see the "light at the end of the tunnel" (or at least how to navigate the tunnel better). In addition, it was very encouraging to hear first-hand from leaders at the NIH the value they put on physician-scientists and how they want to fund this path. Overall, this course re-invigorated my passion towards advancing understanding of Neurological disease both in the clinic and in the laboratory.
3. The CRCC course provided a very valuable perspective from early, mid, and senior faculty that have managed to make the type of career I would like to have in the future a reality. It was also great to interact with other students from many institutions at the same stage.
4. This was a wonderful program! The CCRC course covered all kinds of topics that every MD/PhD student should think about. It helped me to make new friends in my subfield of neurology, connect with mentors that I would want to work with during residency, and think about how I can plan ahead to become a physician-scientist in neurology. I am so grateful to have had the opportunity to attend this course.
5. This course was an invaluable experience. It provided me with concrete, actionable, and specific advice on how to continue to pursue a research career as I progress in my clinical training. In particular, I feel much more prepared to navigate the world of training grants / career development grants and will be better equipped to apply for these when the time comes.
6. This course has provided more incentive and encouragement to stay involved in academic medicine and pursue the true physician scientist career than any other single experience of similar brevity. Right now, the picture from basic science labs, in which non-clinician scientists are overwhelmingly more prevalent than clinician scientists, is extremely bleak. Post docs are spending many many years without transitioning to independence. K99s seem to be the only ticket, but the idea of going toe to toe with people who have had 100% protected time is daunting. As a result, many MD/PhD students who entered their MSTPs "gung ho" for the physician scientist career are considering other options very seriously. Attending this conference did so much to allay my fears and doubts. I realize after doing this that there is a well thought out series of steps to get me from where I am now (beginning fourth year medical school after having completed a PhD one year ago) to successfully applying for my first R01 - literally no other experience in my entire training has given me this confidence (and in fact most have absolutely discouraged it, which is completely

appropriate advice for basic scientists). I cannot overstate the importance of this brief workshop. It has breathed new life into my ambitions and picked up my spirits. Please please please do not discontinue funding for this workshop. It adds so much value at so little cost.

7. It is very difficult for medical students, particularly those who don't formally have a PhD but are interested and productive in a research lab, to get a grasp of the hoops that we will need to jump through to be effective clinician-scientists in the future (including getting a grasp on the timeline of applying for money). It is especially difficult because there are not many role models to seek guidance from. This course was valuable not only on what top me, but it allowed me to meet people whose career mirrors my aspirations and allowed me to get advice from them which I could not have done in any other setting.
8. The CCRC course gave useful, practical insight into career pathways for physician scientists interested in neuroscience and also provided encouragement and motivation to pursue such pathways. Additionally, it offered excellent opportunities to network with peers/colleagues, junior faculty, and senior faculty and have candid discussions about the course content, personal experiences, individual questions, and advice. Overall, it was a highly informative, useful, and inspiring course that further solidified my decision to pursue a career in academic neurology.
9. I don't have many examples of successful clinician-scientists, especially in neurology, at my institution, so I have had doubts that my ideal career is achievable. The CCRC not only showed me that it is a viable career path, but also provided information and networking to make achieving that career more likely.
10. The CCRC course helped me better understand the funding mechanisms for future clinician-scientists at different stages of their training. Knowing about these funding opportunities allows me to better plan the next steps in my career. The course also provided insight into the challenges, both professional and personal, faced by clinician-scientists; I found this to be very valuable. The course was also encouraging and motivating; after completing it, I feel more committed and satisfied with my decision to become a clinician-scientist.
11. The CCRC in Neuroscience course is extremely valuable and continuing its funding should absolutely be a priority! The course provided us students with a vibrant atmosphere that fostered networking and collegiality with each other and with junior and senior faculty career mentors, furthered our enthusiasm for the physician-scientist career path, established a framework for us to develop a timeline and reasonable expectations of our career trajectory, and more. I highly recommend this course for all students interested in the physician-scientist career path!
12. The CCRC course was great in bringing together a diverse group of individuals all around the same stage of training. It was wonderfully refreshing to discuss career plans and ideas with new people, especially as a later-year MD/PhD, and exciting to consider the possibilities. Moreover, it was very helpful to know how exactly neuro residencies were structured to allow for research time and be able to determine that yes indeed this is a feasible path with strong support. I can say with certainty that I feel more confident about pursuing a neuro residency knowing that I will have opportunities to get involved with and stay in research.

13. The CCRC course is invaluable in providing young medical trainees with significant interest in research careers with tools, information, and mentors to succeed in their goals. The panels, talks, and networking sessions were all incredibly helpful and informative and lay the groundwork for future collaborations. I especially appreciated learning the basics about NIH grant applications, meeting inspirational junior and senior faculty who had succeeded in combining careers in medicine and research, and meeting peers who shared similar career interests in the neurosciences. I very much hope that the CCRC course can continue being offered to future students.
14. This was an incredibly valuable opportunity to interface directly with NINDS leadership at the start of our careers. It really made me feel that becoming a physician scientist was attainable and worthwhile. I think it will generate more applications for early career grants and lead more people to devote their careers to science.