Mount Sinai

The Mount Sinai Postdoc Periodical

Monthly newsletter, March 2017

In this issue:

Interview with Dr. Guy Montgomery, New Director of the Office of Postdoctoral Affairs

By Delaine Ceholski

Dr. Montgomery is an Associate Professor in the Departments of Oncological Sciences and Psychiatry at ISMMS. He is also Director of the Integrative Behavioral Medicine Program, Director of Psychological Services at Mount Sinai's Dubin Breast Center, and principal investigator of three NIH funded grants (R01, R25E). He received his PhD in Clinical Psychology from the University of Connecticut and completed a fellowship in psycho-oncology at Memorial Sloan Kettering Cancer Center. He has been a faculty member at ISMMS since 1998, and he is the newly-appointed Director of the Office of Postdoctoral Affairs. As Dr. Montgomery begins his new role, we sat down with him to find out more about his plans for the Office of Postdoctoral Affairs.

What motivated you to consider the position of Director of Office of Postdoctoral Affairs (OPA) at ISMMS?

As past director of the Postdoctoral Training Program in Cancer Prevention and Control, and a primary mentor of several postdoctoral fellows myself, it is incredibly rewarding to play a role in helping young scientists find their passion, enhance their skills, and develop into innovative and independent researchers. I saw the OPA position as an opportunity to help ISMMS's broader postdoctoral fellow community to thrive.

What do you envision for the future direction of the OPA?

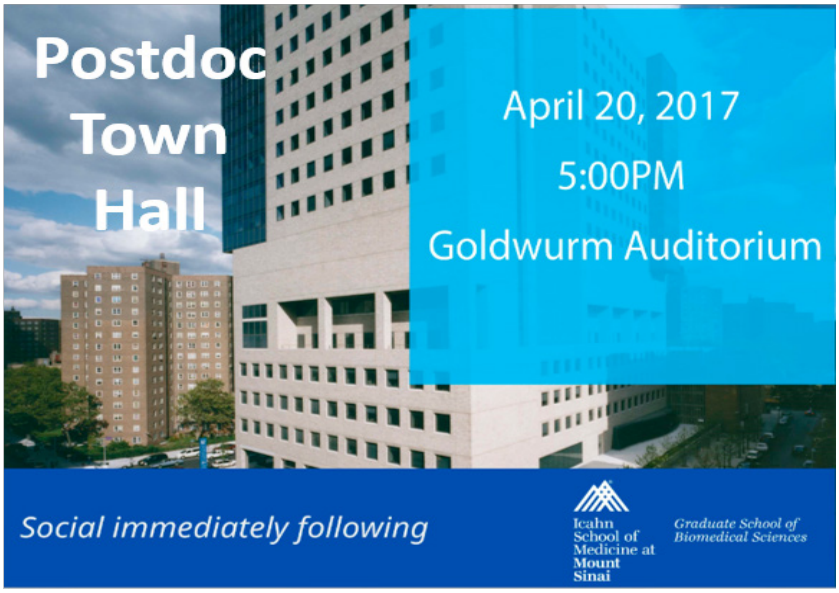
First and foremost, the OPA needs to listen to, empathize with, and be responsive to the postdoctoral community. Ultimately, I see the OPA as being an important interface for postdoctoral fellows, faculty, and administration at Mount Sinai.

What ideas or plans do you have for future programming for postdocs from the OPA?

In keeping with my answer to the previous question, my first plan is to seek feedback from the postdoctoral community regarding what programming you've enjoyed in the past, what gaps in programming you've noticed, what programming you would like to add, and who some "dream" speakers would be. I will use this feedback to develop a programming portfolio, and solicit continuing feedback on an annual basis. Overall, I think a holistic mix of science, professional development, and wellness is indicated.

Come to Goldwurm Auditorium (Icahn Building) on Thursday, April 20 from 5-6pm to meet Dr. Montgomery and other ISMMS leadership. You will hear about new positive changes to the postdoctoral training program at ISMMS and postdoc awards. A social will follow!

Dr. Guy Montgomery, PhD



Co-Chair Corner

Greetings fellow postdocs!

This month's 'Co-Chair Corner' marks my last as co-chair of the Postdoc Executive Committee (PEC). This year has seen many positive changes for the postdoc community at ISMMS: the establishment of a 5-year postdoc term, the formation of a Trainee Mistreatment Resource Panel, and the implementation of an International Teaching Policy and a $50,000 salary minimum for postdocs. One of the highlights of this year was the PEC being awarded the Distinguished Service Award from the National Postdoctoral Association (NPA). We are grateful to be accepting this award at the Annual Meeting of the NPA (March 17-19) in San Francisco – make sure to check out the PEC on Facebook, Twitter and LinkedIn and the NPA's website (http://www.nationalpostdoc.org/) for pictures and updates! Looking back on this year, it's been a pleasure and an honor to promote and advocate on behalf of our 600-strong postdoc community.

Looking to the future, I am thrilled to announce that Dr. Nicholas Barbieri will assume the role of co-chair on April 1. A postdoc in the Department of Pharmacology and Systems Therapeutics and a passionate advocate for the LGBTQ community and diversity initiatives, I know that the ISMMS postdoc community is in terrific hands moving forward. This year, the PEC and Office of Postdoctoral Affairs will soon be releasing an updated version of the Postdoc Handbook. The PEC is also working on its own website and informational brochure and will be releasing the 2017 Annual Postdoc Survey in May/June. Last year, our survey had a response rate of almost 70% and we hope to achieve similar numbers this year. We will again be running our Future Leaders in Science Education and Communication and Project Management short courses - so keep your eyes peeled for emails calling for applications! The PEC's Biotech Club is organizing an Industry Panel Discussion with leaders from various pharma and biotech companies on April 14 from 4-6pm in the Davis Auditorium – an announcement will be coming soon via the postdoc and PostdocPro listservs.

Finally, we would like to encourage all postdocs to attend the Postdoc Town Hall on Thursday, April 20 from 5-6pm in the Goldwurm Auditorium (Icahn Building). This event is being organized by the Graduate School and will introduce the new Director of the Office of Postdoctoral Affairs. The Town Hall will also describe new changes to the postdoc training program at ISMMS and postdoc awards that will be given at the Spring Ceremony starting this year. There will also be an opportunity for postdocs to ask questions and have their voice heard. Please remember to RSVP and we hope to see you there (https://www.eventbrite.com/e/graduate-school-town-hall-for-postdoctoral-fellows-tickets-32328017972)! A social will follow the Town Hall so come and meet your ISMMS Graduate School leadership!

Signing off,

Delaine

Catarina Saiote and Delaine Ceholski are your PEC co-chairs

Ways to keep in touch

- Our website: http://icahn.mssm.edu/education/postdoctoral-training
- Follow our Twitter account: **@MtSinaiPostdocs**
- Join our Facebook page: **"Mount Sinai Postdocs"**
- Follow us on LinkedIn (**Mount Sinai Postdocs and Postdoc Alumni**)

The Mount Sinai Postdoc Periodical
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Learning and forgetting intelligently: why sleep is essential

By Elena Sanchez-Rodriguez

We spend one-third of our lives sleeping, but the biological purpose of sleep has remained elusive. While the whole body benefits from sleep[1], the brain suffers the most from sleep deprivation, as the most immediate, unavoidable effect of sleep deprivation is cognitive impairment. Sleep has been shown to be important for consolidating newly-formed memories. It has been suggested that during wakefulness, when animals interact with their environment and need to learn, there is a net increase in synaptic strength in many brain areas. In this view, sleep would be necessary to renormalize synapses to a baseline level that is sustainable and ensures cellular homeostasis[2].

In February 2017, two major studies were published in Science[3,4] and show that the brain performs its "housekeeping" while we sleep, allowing it to clear away waste. While different, both studies provide strong evidence for synaptic down-scaling during sleep and up-scaling during wakefulness as well as clues to their respective molecular mechanisms.

In one study[3], the authors focused on the areas of the mouse brain responsible for learning and memory: the hippocampus and cortex. By using quantitative proteomics, they showed that there was a significant drop in receptor protein levels in sleeping mice, indicating an overall weakening of their synapses compared to mice that were awake. This is the first evidence of homeostatic synaptic down-scaling in live animals. The authors also focused on the protein Homer1A, which is present at much higher levels in the synapses of sleeping mice. Knockout of Homer1A abolished the significant drop in receptor protein levels observed in sleeping mice, identifying the important role of this protein. Finally, the researchers trained mice to associate a particular location with mild electric shocks and then treated a subset of mice with a chemical that has been shown to block neurons from pruning their synapses. After transferring the mice to a new environment, the untreated mice explored the new location freely, but those treated with the chemical were found to cower in the corner. This behavior is indicative of fear and anxiety and suggests that these mice had intrusive memories of the shocks they had received in the previous environment.

In the second study[4], the authors argue that the synaptic strengthening that accompanies learning increases the brain's energy consumption and may overload its capacity for processing information. They collected the brains of mice from three groups: those that had just slept, those that had been kept awake by playing with new toys, and those that had stayed awake on their own. The authors used scanning electron microscopy to create high-resolution three-dimensional images of almost 7,000 synaptic connections in two different regions of the cerebral cortex. They observed a decrease in size of synapses during sleep (~18%), consistent with the idea that synaptic connections are scaled down during sleep. However, not all synapses changed size and it is possible that these synapses encode well-established memories that shouldn't be tampered with. This evidence suggests that we don't forget randomly but rather it is done in an intelligent manner.

Together these studies provide the most compelling evidence yet for synaptic weakening during sleep and strengthening during wakefulness. As our knowledge of sleep physiology increases, several questions remain. What computational function might synaptic down-scaling play during sleep? It is known that microglia "prune" synapses, but do they also participate in synaptic down-scaling? Lastly, how is synaptic down-scaling linked to the neuronal activity associated with learning and memory? Everyone knows that catching our ZZZ's is important and we know how poorly we feel when we don't get them. These new studies are seminal in our understanding of the biology of sleep and will hopefully open the door to more in-depth knowledge of learning, cognition, and memory.

References:

1. Knutson KL et al. (2007) Sleep Med Rev
2. Tononi G et al. (2006) Sleep Med Rev
3. de Vivo et al. (2017) Science
4. Diering et al. (2017) Science

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