### Department of Anatomy & Neurobiology Fall 2020 Newsletter

#### Dear Fellow Members of the Department of Anatomy & Neurobiology,

Greetings and welcome to the Fall 2020 A&N newsletter, thoughtfully compiled by Vesalius Masters student **Jinyan Zhou**. Many thanks to her for her hard work pulling this together! After a summer of intense preparation by our teaching faculty, students and staff, the Fall semester courses were smoothly implemented with nary a hitch despite major pandemic-related challenges and constraints. Most of our large-scale courses such as Medical Gross Anatomy, Cellular Organization of Tissues and Dental Anatomical Sciences were run in a hybrid mode -something particularly challenging for our educators- wherein course material was offered both in person and via Zoom. Some graduate level courses and our journal clubs were conducted primarily or exclusively via Zoom. Masters in Forensic Anthropology, Biomedical Imaging and Biomedical Forensic Sciences courses were largely offered in person, a necessity of the practical nature of the material being taught, while Healthcare Emergency Management (HEM) remained an online



degree program. Major kudos are due to all of the **A&N faculty** and **graduate teaching fellows** -as well as to **BU staff** who ensured our safety for working so hard to make the Fall semester a success across all of our varied programs and to our **graduate students** for being flexible and engaged despite the significant challenges! Among the students it is important to note that we welcomed a record number of first year incoming Masters students- 7 in HEM, 22 in Bioimaging, 15 in Forensic Anthropology, 28 in Biomedical Forensic sciences and 12 in the Vesalius Masters. We also welcomed 3 new PhD students to the department this Fall.

The majority of our wet lab research laboratories have been able to continue operations while adhering to strict University-approved safety protocols, while those which study primarily human subjects have experienced more significant delays due to safety concerns for research participants. Nevertheless, department members have continued to publish prolifically and several faculty members were awarded major funding, including **Dr. Tara Moore** who received an NIH/NIA R01 to study extracellular vesicle treatment and age-related neuropathology, **Dr. Rhoda Au** who received a grant from the American Heart Association and Bill Gates to work on a health technology research joint initiative, and myself, awarded an NIH/NIA/NSF R01 award to study age-related changes to cortical dynamics underlying working memory. Congratulations also go to **Dr. Ron Killiany** who was promoted to Full Professor of Anatomy & Neurobiology in recognition of his scholarly excellence in neuroscience and his contributions to the department as an educator.

Sadly, this October we marked the passing of **Dr. Dee Pandya** who was an important and beloved member of the Anatomy & Neurobiology faculty for many years. Dr. Pandya will be remembered not only as a superlative neuroanatomist who made fundamental contributions to our understanding of the cerebral cortex, but also as a warm and giving person who had a very positive impact on a generation of trainees, collaborators and colleagues. Please see the tribute to Dr. Pandya by **Dr. Kathy Rockland** in this newsletter, together with remembrances from several other faculty who knew and admired him. Notably, **Dr. Gene Blatt**, a former member of our faculty who also trained with Dr. Pandya, has donated a remarkable reproduction of the **Atlas of Cytoarchitectonics of the Human Cerebral Cortex by von Economo** to the department in his memory. Many thanks to Dr. Blatt for this generous gift and for his heartfelt words about Dr. Pandya.

It has now been 9 months since the onset of the pandemic changed each and every one of our lives dramatically. During this time, some members of our community have experienced tragic loss, many have experienced personal hardship, and all of us have had to adapt to innumerable changes in our day-to-day lives. In the face of this, it is wonderful to know that we are part of a professional community that is cohesive and supportive of one another, and that we are eminently capable of carrying out our professional duties -be these as students, administrators, educators or researchers- with professionalism and equanimity. I wish each and every one of us peace and comfort during this holiday season, a restful intersession and sincere hope for better days in the year to come.

Take care and stay well, Jennie

# A Tribute to Dr. Deepak Pandya



### IN MEMORY:

Dr. Deepak Pandya was a long-time faculty member in the A&N department. He was a renowned expert in cortical anatomy and made significant contributions to understanding the connectivity in the cerebral cortex. He will forever be remembered by his outstanding leadership in research, mentorship, and friendship.

From Dr. Kathleen Rockland - A Tribute: Professor Deepak Pandya (1932-2020)

It is with great pleasure that I write this brief tribute to Professor Deepak ("Dee") Pandya, although the occasion of his passing last October brought considerable sadness. I knew Dee well in the 1970's, as his first graduate student (among a large number of neurology residents and postdocs). Dee had many Departmental associations, having joined as faculty in 1968 (1968-2015!); and a glance at his publication list will reveal a number of familiar names, including Doug Rosene, Brent Vogt, Helen Barbas, and Don Siwek, his second BU graduate student. Apart from his stellar research program, one of Dee's major accomplishments was surely his role as an effective and supportive mentor. The full roster of his trainees is truly impressive, and I won't attempt to give a list; but especially worth noting are his long-term and close interactions with many who began with him as trainees and then continued as collaborators. Established senior researchers like Ed Yeterian (Colby University), Michael Petrides (U. of Montreal), and Doug Rosene (Boston University) first published with Dee in the 1980's, but were co-authors with him well into the 2000's.

Dee is without question one of the pioneer researchers of cortical organization of the primate brain. Reviewing his publication list, as I have just done, is a travelogue through the brain. This direction was set with his first publication (Pandya and Kuypers, 1969), and was followed over the decades by a steady stream of papers dealing with cellular architecture and connectivity of, at the time, comparatively uncharted neocortical and limbic areas: entorhinal, cingulate, frontal cortices; auditory and visual association areas, posterior parietal cortex, and temporal association areas. Other, related lines of work were directed to subcortical connectivity, mainly corticothalamic, corticostriatal, and corticopontine. The connectivity studies of the 1970's, and subsequent decades of the 20th century, were carried out with pre-viral anterograde (i.e., tritiated amino acids) and retrograde (HRP) tracers. A strong testimony to the rigor of experimental design and carefulness of analysis is the degree to which this work has "stood the

# A Tribute to Dr. Deepak Pandya

test of time." Even the early papers, from 1969 through the 1980's continue to be cited by papers in 2020.

Dee was always concerned about functional aspects of anatomical results. For this, he thought about clinical results (e.g., several papers on language circuitry), homologies of monkey and human cortex, and ideas of evolutionary trends, in particular, as developed by F. Sanides.

Dee's research started with lesion-degeneration methods (Nauta and then Fink-Heimer staining techniques), substantially coincided with the glory days of autoradiography and HRP, and then more recently attracted renewed interest from the imaging community, as a guidebook to network organization and, separately, anatomical "ground truth" for tractography. Although Dee is more usually associated with his tracer studies of cortical and cortical-subcortical organization, the anterograde tracer injections also were an excellent label for fiber pathways; and this direction took on renewed relevance with the exuberant development of tractography in the human brain. Thus, his 2006 volume with Jeremy Schmahmann (Fiber Pathways of the Brain) is a landmark reference and one of the few modern "gold standard" mappings of anatomical bundles and trajectories. Here, too, Dee was ahead of his time; and his deep interest in white matter organization was apparent much earlier on ("Some Observations on the Course and Composition of the Cingulum Bundle in the Rhesus Monkey," 1984; "The Mysterious Relocation of the Bundle of Turck," 1992; among others).

Another great accomplishment of Dee's career was that he managed to prioritize both family and career. His Wikipedia entry notes, under contributions and research, that he and his "...

wife, Bonnie, are the parents of NASA astronaut Sunita Williams." Dee, as many people will attest, was extraordinarily modest, but he must have been well aware that he had parented, not only a US (female) astronaut, but generations of dedicated and creative neuroanatomists. He will be long remembered, with affection and respect.

#### References

 "Gary W. Van Hoesen" (2013) in J. Comp. Neurol. 521: 4095-4096. Dr. Pandya's memoriam for Dr. G.W. Van Hoesen.
PubMed (D.N. Pandya)
Wikipedia (Deepak Pandya)



Dr. Deepak Pandya, and with his daughter, the astronaut Sunita Williams

### A Tribute to Dr. Deepak Pandya

From Dr. Gene Blatt, faculty member of A&N

"Dr. Deepak Pandya, "Dee" as he was universally known, was a master of cortical and subcortical connectivity and he was perhaps the world expert in the field. A friend, Incredible mentor to many of us Including PhD students, postdocs and faculty in the Anatomy and Neurobiology department at BUSM and taught us to pay close attention to detail in brain anatomy. Many of us who met with him regularly over the years looked forward to working together on brain connectivity. I think above all, Dee was a gentle soul and no matter what was going on with your life's challenges, you can find solace in meeting with him and sharing thoughts and ideas. He was so generous spreading his knowledge to others and we were so fortunate to cross paths with him for many years at BUSM. Dee affected so many of us and we are all so very grateful for sharing his wisdom and grace. We are all far better individuals for knowing and learning from him and will forever remember the profound and informative times together and the generous mentorship he provided without hesitation."

#### From Dr. Helen Barbas, Professor of Health Sciences and Anatomy & Neurobiology

It is hard to write about Dee in the past tense. Along with the deep sadness that comes with the news, there is a flood of other emotions in reminiscing about Dee as a mentor, colleague and friend. I will only add a couple of professional-related points, and then share some comments from a personal perspective.

Deepak Pandya joined the Harvard Neurology Unit, first housed at Boston City Hospital, which then moved to Beth Israel Hospital. The unit was a vibrant place of theoretical ideas about the language areas of the cortex and the pathways that may support their interaction. Dee was a pioneer in investigating the pathways that interlink auditory association areas and link them with frontal areas, consistent with ideas about their possible roles in language. The early ablation-degeneration methods used to study neural pathways were not for the faint of heart, and only a few could master them to obtain reliable data. Dee was in that small group of masters, and his early papers became classics because of his meticulous study, analysis and interpretation for cortical organization in primates. When neural tracers were introduced to study pathways in the early 70s, Dee quickly used the new methods and his work expanded to other cortico-cortical pathways and linkage with the cerebellum in monkeys.

I got to know Dee as a postdoctoral fellow at the Harvard Neurology Unit, Beth Israel Hospital. Dee had already moved to the Bedford VA hospital, but he visited with members of the unit and continued collaborations with several. I was drawn to Dee's work because of his interest in evolution, an interest I shared from my graduate studies at McGill. Dee had studied with one of the great architectonic scholars in the field, Fredrick Sanides, and deeply appreciated ideas about the origin of the cerebral cortex in evolution. In this context, we embarked on a study of the architectonic organization of the prefrontal cortex in rhesus monkeys. We spent many hours once a week on the double-viewer microscope negotiating the placement of borders between areas based on laminar features, as he did with many others. My most enduring memories of Dee came from those meetings and the stories he shared that revealed his love for discovery, humility, and pacifist philosophy of life. I remember his humor and colorful naming of areas as 'serene', or 'full of noisy boys jumping up and down' (to describe an area with uneven distribution of large pyramidal neurons in layers III and V). The stories and descriptions ensured memory of the salient features of areas. I remember sharing vegetarian meals at home, at Indian restaurants, and in other countries during conferences. Beyond his widespread contributions to cortical circuit organization of lasting value, I will always remember Dee for his broad perspective about life and humanity, his love for his family, and generosity and warmth towards his students, colleagues and friends.

# -New Technology in the -Gross Anatomy Laboratory





This year, thanks to a generous donation, we welcomed the addition of many new resources. We now have access to three new ultrasound machines and an Anatomage table, both available in the Anatomy lab! And thanks to Dr. Linda Afifi and her efforts, we also now have full access to <u>Thieme Atlases</u>! These wonderful resources will help our students and faculty in our teaching and learning mission in anatomy.

### Wellness Resources

Here are some wellness resources provided by the Associate Provost at BU:

- <u>Headspace</u>, a research-backed app for mindfulness and meditation. Available for free to all BU degree-seeking students.

- <u>Wellnest</u>, a voice-powered journaling app that has daily check-ins and guided content on topics like imposter syndrome, happiness, resilience, and much more. Available for free to all BU students.

- <u>The Wellbeing Project Virtual Resources</u>, a curated list of BU mental health and wellbeing resources available to all BU students.

- <u>Behavioral Medicine Groups</u>, virtual groups on topics such as managing anxiety, grief, mindfulness, as well support groups for graduate students, Black students, and the LGBTQ+ community.

- Programming at the Howard Thurman Center and through the BU Arts Initiative.

- <u>Food Insecurity Resources</u>, a list of food and nutrition resources at BU and within the local area.

- <u>Graduate Education Health & Wellness Resources</u>, a list of many local and BU resources and initiatives pertinent to graduate and professional students.

# COVID-19 Testing During Break

Test Collection Hours Over Intersession (December 24–January 1):

December 24: All collection sites will stop collection at noon

December 25–26: All collection sites closed

**December 27:** The following two collection sites will be open

- Rajen Kilachand Center for Integrated Life Sciences & Engineering, 610 Commonwealth Avenue, 7 am-2 pm
- Agganis Arena Lobby, 925 Commonwealth Avenue, 8 am–2 pm

December 28–29: All collection sites closed

December 30: Three collection sites will be open

- Kilachand Center, 610 Commonwealth Avenue, 7 am-2 pm
- Agganis Arena Lobby, 925 Commonwealth Avenue, 8 am–2 pm
- BU Medical Campus, Room R107, 72 East Concord Street, 7 am–2 pm

December 31–January 1: All collection sites closed

January 2: All collection sites open and resume operations as normal

Read more on screening and testing during the break and upon returning to campus here. Stay safe!

## **Recent Publications**

Baxi M, Di Biase MA, Lyall AE, Cetin-Karayumak S, Seitz J, Ning L, Makris N, **Rosene D**, Kubicki M, Rathi Y. Quantifying Genetic and Environmental Influence on Gray Matter Microstructure Using Diffusion MRI. Cereb Cortex. 2020 Nov 3;30(12):6191-6205. doi: 10.1093/cercor/bhaa174. PMID: 32676671; PMCID: PMC7732156.

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