

Movement Disorder Digest

News from the Johns Hopkins Parkinson's Disease and Movement Disorders Center

Spring 2018

Exciting Team Additions!

The Johns Hopkins Parkinson's Disease and Movement Disorders Center is pleased to welcome two movement disorder fellowship trained faculty members, Emile Moukheiber, M.D. and Ankur Butala, M.D., and a new registered nurse, Kori Ribb, B.S.N., R.N., C.N.R.N. to our center! Below, please find information about them and their roles on our team.

Dr. Emile Moukheiber joined the Johns Hopkins University School of Medicine in July 2016 as a movement disorder fellow after attending medical school at the American University of Beirut and completed his residency in Neurology at Tufts Medical University in Boston. He now joins our center as a faculty member, seeing patients with all varieties of movement disorders and participating in several clinical research projects.



Emile Moukheiber, M.D.

Dr. Moukheiber has experience in research on social phobias, has completed public health work with non-governmental organizations, and is the founder of his own organization that provides home health care in the form of advanced nursing, occupational and physical therapy to underserved communities in third world countries - with particular emphasis on those with neurodegenerative disease.

He also has clinical interest in teleneurology to help bridge the gap between the tertiary care available in well-funded facilities and those with geographic boundaries impeding their access to care. He is also interested in the integration between music and medicine, specifically in the treatment of musician's dystonia.

He has assisted in protocol development and is a co-investigator in the Guitar-PD research study at Johns Hopkins. He will also join the Parkinson's Progression Markers Initiative (PPMI) study team, under the sponsorship of the Michael J. Fox Foundation.

Dr. Moukheiber is currently accepting new patients. To schedule an appointment, please call (410) 502-0133, option 2.



Ankur Butala, M.D.

Dr. Ankur Butala joined the Johns Hopkins University School of Medicine in July of 2015 for his fellowship at the Parkinson's Disease and Movement Disorders Center. He is a graduate of a combined BS-MD Physician Scientist Accelerated Program through the Rensselaer Polytechnic Institute and Albany Medical College. Dr. Butala practiced as a physician at Albany Medical College from 2004 to 2008. He then completed residencies in both Psychiatry and Neurology at UMass Memorial Medical Center from 2008 to 2014.

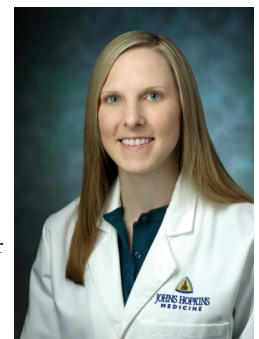
Dr. Butala has a variety of other medical experiences which include a movement disorders rotation with world-renowned Dr. Michael Okun of University of Florida at Gainesville; a

functional neuroimaging rotation at King's College in London; and working as a neurohospitalist and addiction psychiatrist. Dr. Butala has published several peer-reviewed papers and abstracts, as well as presented at numerous international, national, and local meetings.

His primary research interests are utilizing invasive and non-invasive neuromodulation techniques to better understand and treat otherwise treatment refractory neuropsychiatric conditions including non-motor aspects of Parkinson disease, dementia, psychosis and traumatic brain injury. In addition, he has a parallel interest in the biology and modulation of endogenous cannabinoids and how it might impact these neuropsychiatric conditions.

Dr. Butala is currently accepting new patients. To schedule an appointment, please call (410) 502-0133, option 2.

Kori Ribb joined our center as a Research Nurse in February 2018. Kori started her nursing career at Johns Hopkins Hospital in 2009 as a bedside nurse in the Neurosciences department, where she also received her designation of a Certified Neurosciences Registered Nurse (CNRN). She continues to be interested in Neurology and was intrigued to expand her knowledge in clinical research and the care of those with neurodegenerative disease in an outpatient setting.



Kori Ribb, B.S.N., R.N., C.N.R.N.

Kori is excited to use her knowledge and clinical skills to care for individuals with Parkinson's disease and other movement disorders. She looks forward to participating in several research studies and being a part of each patient's individual journey. She also joins our Dystonia Center as a neurotoxin nurse and enjoys the combination of clinical care with research coordination.

In her spare time, Kori enjoys spending time with her family. Her favorite activities include weekend trips to the beach, swimming, and fishing. Kori and her family are anxiously awaiting the arrival of their third child in September.

Kori would like to thank center staff and patients for such a warm welcome and is honored to be a part of the Parkinson's Disease and Movement Disorders Center.

RESEARCH HIGHLIGHT



Have you had Parkinson's Disease for less than 3 years?

If you answered yes, you may be a potential candidate for our olfactory MRI study. This research study will be looking at using a high-resolution MRI scanner to look at the connections between Parkinson's Disease and general function of the "smell-related" areas of the brain. This research aims to better define early-onset of Parkinson's Disease using smell as an early indicator.

You may qualify for this research study if

- ❖ You are English speaking
- ❖ You are between 18 and 89 years of age
- ❖ You have had PD for less than 3 years
- ❖ You are able to tolerate an MRI brain scan
- ❖ You are able to undergo a smell-identification test and some memory related tasks.

What is involved if I participate

- ❖ Your participation will be for 1 day only
- ❖ Participants will undergo approximately 2 hours of clinical examination
- ❖ Participants will also undergo approximately 90 minutes of MRI scanning

If you are interested in participating or want to learn more, contact

Suraj Rajan, M.D./Alex Pantelyat, M.D.

(410) 502-0133 / (410) 614-1522

Srajan9@jhmi.edu

IRB00141396/PI: Jun Hua, MD

EDUCATION

Why movement disorders specialists vs. other neurological subspecialties?

By Kelly Mills MD

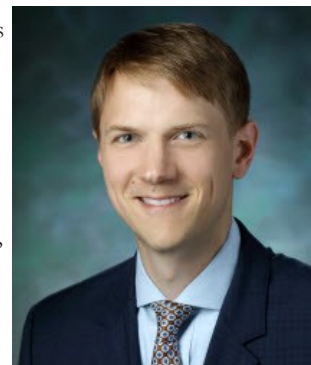
We manifest our passions, pursue social interactions, and even perform daily chores through movement, which is the ultimate consequence of thought and intention. Whether playing golf, strumming a guitar, or even turning the pages of a book, we require smooth, reliable movement control to keep a comfortable pace with the world around us. As such, how could I not be motivated to treat disorders of movement speed, size, and accuracy and empathize with people who have disorders affecting these symptoms?

A close relationship with my paraplegic uncle showed me that personal resilience and fortitude can allow individuals to achieve personal and professional satisfaction despite impairments in movement control. This, and other experiences with persons with neurologic disabilities, made me wonder how I could help people in a similar position gain the knowledge and symptom control such that they felt empowered to overcome barriers preventing them from leading a normal social, family, and work lives. I found that I could pursue this as a neurologist and because the practice of Movement Disorders includes several diseases that are progressive over time, I was drawn to the opportunity to form long-term relationships with patients and provided advice and education as their disease changes over time. Also, the actual practice of treating movement disorders is largely based on speaking with and examining patients in person, not just on the interpretation of lab tests or imaging studies. Furthermore, treatment changes largely depend on these two pieces of information: what the patient says, and how he/she

is performing on our physical exam. This creates a unique doctor-patient interaction that is unlikely to be replaced by automation anytime soon.

While it is unfortunate that we do not have disease-modifying pharmacological agents to slow or stop Parkinson's disease, spinocerebellar, cerebellar ataxia, or most other movement disorders right now, it is very motivating for me as a researcher to be in a subspecialty where there is so much potential for breakthrough discoveries on the horizon. I have always been drawn to the mechanism of "how things work" and one of the most well-understood brain systems is that of motor control, though we are still just scratching the surface in this knowledge. Doing research on movement disorders like Parkinson's disease allows me to combine my interest in understanding mechanisms with the need to improve the lives of people suffering from these diseases.

Working with movement disorders patients over time and researching their diseases is intellectually and personally gratifying. It is a chance to form trusting relationships with patients that will last for years, and to learn new insights from these patients that we can translate into breakthrough treatments for many others in the future. I could not imagine being happier in another subspecialty of neurology.



RESEARCH STUDIES

Condition	Title	Objective	Eligibility	PI	Contact
Parkinson's Disease	Parkinson's Progression Markers Initiative Genetic Cohort	Identify genetic links to PD and learn how the LRRK2 mutation affects certain populations of people (Part of the Michael J. Fox Foundation Parkinson's Progression Markers Initiative)	1.) Individuals diagnosed with PD who are of Ashkenazi Jewish decent 2.) Individuals without PD who are of Ashkenazi Jewish decent AND have a first degree relative with PD	Liana Rosenthal, MD (NA_00039232)	Kori Ribb 410-614-2216
Parkinson's Disease	APL-130277 for the Acute Treatment of OFF Episodes	Evaluate APL-130277 (sublingual version of Apokyn medication) in treatment of sudden "off-time" in PD	Individuals with PD, taking levodopa and having at least 2 hours of "off-time" daily	George Ricaurte, MD (NA_00086593)	Kori Ribb 443-287-7850
Parkinson's Disease	Anxiety in Parkinson's	One day visit to assess anxiety symptoms in PD	All individuals diagnosed with PD	Gregory Pontone, MD (NA_00092051)	Kate Perepezko 410-614-1242
Parkinson's Disease	Rotigotine for Anxiety in PD	8 week study of Rotigotine for the treatment of anxiety disorders in PD	Individuals diagnosed with PD experiencing anxiety	Gregory Pontone, MD (NA_00092051)	Kate Perepezko 410-614-1242
Progressive Supranuclear Palsy	PASSPORT	To determine if an investigational medication (BMS 986168) may potentially treat human tauopathies, such as PSP	Individuals diagnosed with PSP (possible or probable) <5 years	Alex Pantelyat, MD (IRB00127218)	Emily Carman 410-955-8909
Parkinson's Disease and related disorders	Udall Center Longitudinal Study	Examine the relationship between the clinical symptoms of PD and the disease process in brain tissue (participation includes eventual brain donation)	Individuals diagnosed with PD or atypical PD and those without a neurological diagnosis	Liana Rosenthal, MD (NA_00032761)	Catherine Bakker 410-616-2814
Parkinson's Disease and related disorders	Udall Center Brain Donation Program	Examine the pathological changes in the brain tissue of individuals diagnosed with PD or related disorders as compared to controls	Individuals diagnosed with PD or atypical PD and those without a neurological diagnosis	Liana Rosenthal, MD (NA_00032761)	Catherine Bakker 410-616-2814
Movement Disorders	Genetic Characterization	To study the genetic risk factors involved in movement disorders	Individuals with PD, atypical parkinsonism, dystonia, ataxia, and Lewy body dementia	Jeffrey Rothstein, MD, PhD (NA_000554)	Kecia Garrett 410-502-0133
Parkinson's Disease	Establishment of a Clinical Neuropsychological Database on Parkinson's Disease and Other Movement Disorders	To assemble cognitive, mood and other psychological test results for use in future studies	All PD and ET patients seen for clinical assessment in the Division of Medical Psychology	Jason Brandt, PhD (NA_0001573)	Barnett Shpritz 410-955-1469
Parkinson's Disease	Effects of Subthalamic Nucleus Deep Brain Stimulation on Decision-Making in Parkinson's Disease	To determine whether treatment with DBS changes the perceived value of prizes and rewards, attitudes toward risk-taking, and other aspects of decision-making	Individuals with PD who are about to receive surgery for bilateral STN DBS; neurologically healthy individuals	Jason Brandt, Ph.D. (IRB00078439)	Barnett Shpritz 410-955-1469

RESEARCH STUDIES (continued)

Condition	Title	Objective	Eligibility	PI	Contact
Parkinson's Disease	National Parkinson Foundation Patient Registry	Develop quality care standards for PD	All PD patients and care partners seen at the center	Kelly Mills, MD (NA_00036863)	Nikki Mennucci 410-955-6684
Parkinson's Disease	Exploring Mechanisms for Neuropsychiatric Symptoms of PD using Transcranial Direct Current Stimulation (tDCS)	To study if tDCS helps depression, cognition, or other non-motor PD symptoms	All individuals diagnosed with PD who have symptoms of depression	Kelly Mills, MD (NA_0008795)	Yousef Salimpour 410-502-2666
Parkinson's Disease	Investigations of Neurovascular Abnormalities in the Olfactory Cortex Using Advanced MRI Technologies	The primary objective of this study is to investigate neurovascular abnormalities in the olfactory cortex using advanced MRI techniques.	PD patients diagnosed for more than 3 years who are able to tolerate a MRI brain scan and undergo smell and memory identification tasks	Jun Hua, PhD (IRB00141396)	Adrian Paez 443-923-9551
CBD, PSP, vPSP, healthy controls	4RTNI-2	Select individuals with CBD, PSP or vPSP; healthy controls; caregiver component	Select individuals with CBD, PSP or vPSP; healthy controls; caregiver component	Alex Pantelyat, MD (NA_00130505)	Diane Lanham 443-287-4156

Neuropsychological Effects of Deep Brain Stimulation for Parkinson's Disease

By Jason Brandt, PhD

As most readers of this newsletter will know, Parkinson's disease (PD) is characterized by its movement disorder, but also has a significant psychological component. Patients with PD frequently have mood symptoms (with depression, anxiety, and embarrassment being the most common), and some proportion have significant impairments in cognition (thinking and memory). Research by my colleagues and me in the Johns Hopkins Movement Disorders Center has focused on specifying the nature of these psychological changes and how best to treat and/or manage them.

The discovery of levodopa as a treatment for PD in the 1960s had to have been among the most significant medical advances of the 20th century. While dopamine replacement medications and dopamine agonists (drugs that enhance and sustain the activity of dopamine at the synapse) can be remarkably effective in reducing symptoms of PD, they can have significant behavioral effects when taken at high doses. Much recent research has focused on how these medications alter fundamental drive states. Some patients taking large amounts of these medications develop "behavioral addictions" (e.g., excessive shopping, hypersexuality) and engage in risky behaviors (excessive gambling, shoplifting, speeding while driving). These behaviors appear to reflect a selective "overdosing" of brain circuits with dopamine of that regulate reward processing.

What about treatment with deep brain stimulation (STN)? Does it too have the potential to increase risk-taking or otherwise lead to bad decisions? A few years ago, my colleagues and I addressed this question in a study (published in *Neuropsychology*, 2015, Vol. 29, 622-631) comparing PD patients who were receiving DBS in the subthalamic nucleus (STN) to those who were treated with medication only and to neurologically healthy people (as control subjects). We found that,

on risky decision-making tasks, patients with DBS implants took more risks than did healthy participants, but turning the stimulation on tempered this tendency somewhat. In situations where the risk was more ambiguous, DBS patients were more risk-averse (conservative) than were healthy participants, and this tendency was greatest with stimulation. In other words, we found little evidence that DBS of the STN resulted in problematic risk-taking.

We are currently conducting a more definitive study of this phenomenon. PD patients who are about to undergo surgery for implantation of DBS electrodes in the STN are being studied three times: 1) prior to surgery, 2) after surgery with the stimulator turned on, and 3) after surgery with the stimulator turned off. In each session, patients are engaged in a variety of financial choice and decision tasks. For example, if you won a prize, would you rather receive \$1,000 today, or \$1,500 a year from today? When rolling a die, would you rather bet \$1 on one side coming up to win \$50, or any of 4 sides coming up to win \$2? There are no absolute right or wrong answers to these problems. Rather, we wish to discover whether the way people evaluate probabilities and rewards changes when the STN is being stimulated. If you are a PD patient and are scheduled to receive DBS of the STN, please consider volunteering for this study. You can find out more about it by contacting Barnett Shpritz at (410) 955-1469. You can also email me at jbrandt@jhmi.edu.



Sense of Smell in Parkinson's Disease

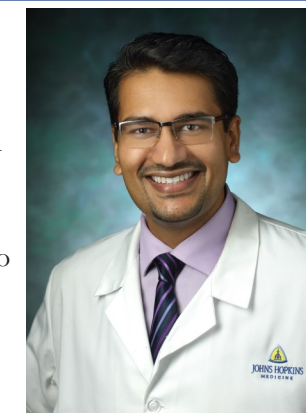
By Suraj Rajan, MD

A reduced sense of smell called *hyposmia* (hypo=reduced, osme= to smell) or a complete loss of it, called *anosmia*, is a common complaint among many patients with brain diseases. This phenomenon has been noted in Parkinson's disease (PD), Alzheimer disease, and disorders thought to be "cousins" of Parkinson's disease such as multiple systems atrophy (MSA), and progressive supranuclear palsy (PSP).

Hyposmia and anosmia in PD have been a focus of research for a long time because 50-90% of PD patients with motor symptoms already have some level of smell impairment. The abnormal proteins called *alpha synuclein* that form strands of "Lewy neurites" and clumps of "Lewy bodies" in the nerves of PD patients tend to affect the nerves of smell (the "olfactory bulb") early on, for reasons yet unknown. Studies that tracked large groups of people for a long time, looking at what diseases they developed down the road have shown that people who have hyposmia or anosmia have a high risk of developing PD in the future. This finding has led researchers to develop smell tests with scratch-and-sniff cards or sniffing-sticks. In the Honolulu-Asia Aging Study (HAAS) for instance, men had a 5.2-fold increased risk of developing PD within 4 years if they fell in the lowest quartile of ability

to smell. This study had its participants identify 12 odors from a scratch-and-sniff test with 4 choices for each answer.

Although we do not know how to treat hyposmia currently, this knowledge is important to research. We already know that PD has a very early phase we call prodromal phase, where hyposmia, constipation and dream-enactment in sleep (REM behavior disorder) can be strong indicators of future development of full-blown Parkinsonism. Blocking the build-up of Lewy neurites and Lewy bodies in this phase of the disease might prevent the progression into the motor phase of the disease. Another avenue of research into smell looks at whether the nerves of smell get "infected" by proteins from outside and spread into the brain like a virus. A similar idea of an infection in the gut spreading through the vagus nerve and into the brain has also been floated. Even if these ideas may be disproved in the future, people with smell-deficits, when identified early, can be recruited to future studies looking at "preventive therapies" for PD.



Pets and Parkinson's

By Bonnie Kaas, MD

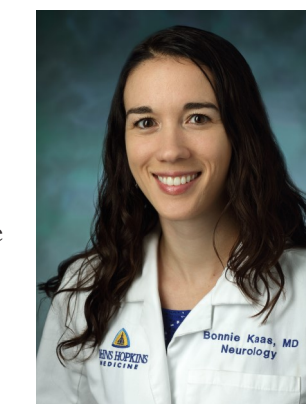
Although more rigorous research is needed, many small studies have suggested that animals may have a healing presence. Spending time with a dog can act as a buffer against stress, and interaction with therapy animals has been shown to decrease loneliness and improve quality of life among elderly people. Companion animals have been associated with improved cardiovascular measures (heart rate and blood pressure), and may even be tied to better outcomes after a heart attack. These benefits don't only apply with dogs, but also with cats, birds, fish...some studies even used robotic dogs! See this article for an overview of the research: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5573436/>.

However, there are some specific considerations for pet ownership when it comes to those with Parkinson's disease. While walking your pet on a leash is excellent exercise, it is very important to make sure the animal does not pull, as this could lead to falls in people with impaired balance. A training class (available at major pet supply stores) is highly recommended to work on leash manners. This will ultimately

allow you to spend more quality time with your pet without worrying about injury.

If you are getting a new pet, make sure you spend some time to research the breed and age group that will best fit your lifestyle and level of activity. Specially-trained service dogs can also help with freezing, balance, and everyday tasks for people with Parkinson's disease (<https://www.assisteddogsinternational.org> to find an organization).

Finally, pets in the bedroom can significantly disrupt sleep – consider a separate bed for companion animals so everybody can be well-rested!



Pacing for Parkinson's

By Kaylin Kopcho

Pacing for Parkinson's (P4P) is one of the largest charity teams in the Baltimore Running Festival. It has evolved into a year-round, volunteer-led campaign that raises awareness of and funds for Parkinson's disease (PD) research, community outreach, education, and patient care at Johns Hopkins. 2018 marks the 10th year that P4P has participated in the Running Festival. In recognition of this noteworthy anniversary, runners, walkers and virtual fundraisers will strive to pass the \$1,000,000 mark for cumulative funds raised!

Over the last year, funds raised through Pacing for Parkinson's have bolstered programs critical to improving the lives of those living with PD, as well as their care partners and loved ones. One of the areas in which P4P philanthropy has made a significant impact is in community outreach and education. The PDMD Center offers a slate of resources that keep people with PD, their caregivers, and those in the medical community informed and empowered, including monthly support groups and an annual patient-provider symposium. The Center also educates those in the medical community about how to care for people with movement disorders.

The Center is also able to sponsor—exclusively or in partnership with other regional and national organizations—several health and wellness programs, in part thanks to P4P. These include a Rock Steady Boxing Program at Forest Hill Health and Fitness with 4 weekly classes and over 60 participants; the continuation of the ParkinSonics choral group; and a new Parkinson's Exercise Program at Brick Bodies in Lutherville-Timonium.

Research is the other area where philanthropy raised through Pacing for Parkinson's has had a significant impact. Through



Team 2016



Team 2017

the generosity of many individuals and corporations, scientific inquiry has been accelerated in several distinct research ventures—Guitar-PD and two aims of the Dystonia Coalition project—and more broadly by protecting the time of a research assistant to coordinate a variety of academic consortia for the PDMD Center.

Guitar-PD, a research protocol by Dr. Alex Pantelyat under the same “music as medicine” banner that yielded the ParkinSonics several years ago, is a controlled, delay-start clinical trial of twice-weekly guitar lessons for people living with Parkinson's disease. Peabody Institute and Neurology faculty member Dr. Serap Bastepe-Gray, a classically-trained guitarist, is co-leading the trial with Dr. Pantelyat. They will evaluate the impact of guitar instruction on hand dexterity as assessed by standard PD clinical rating scales, typing speed and accuracy, and several other validated tasks. The study will also examine the impact of guitar lessons on mood, cognition and quality of life.

As part of the Dystonia Coalition research project, the PDMD Center is addressing two specific aims that may influence the future of clinical interventions in PD and other movement disorders. P4P philanthropy has assisted in the creation of a database that houses videos of and biological samples from people with cervical, focal, and generalized (idiopathic) dystonia, as inquiry into dystonia of the eye.

Our Center is grateful to all of our patients, patient families, volunteers, and community members for their involvement in Pacing for Parkinson's. Please consider how you might be able to assist P4P in its 10th Anniversary year and beyond! Runners and walkers of all skill levels are welcome to participate on Saturday, October 20, and you can also be a virtual fundraiser if geography or prior commitments don't allow you to be present on race day. To learn more or to register for one of the races, please visit <http://pacing4parkinsons.org> or email pacing4parkinsons@gmail.com.

PARKINSON'S PROGRAM CALENDAR

These programs are presented by the *Johns Hopkins Parkinson's Disease and Movement Disorders Center* through various community partnerships and funding sources, including our Center's annual fundraising event, Pacing 4 Parkinson's. Pre-registration is encouraged for all programs listed below. Please contact our center at **410-955-6692** to learn more about these programs. Visit our website at www.hopkinsmedicine.org/neuro/movement for a full listing.

◆ Parkinson's Disease Educational Series

3rd Wednesday of Every Month

7:00 p.m. - 9:00 p.m.

St. Thomas Episcopal Church, 1108 Providence Road, Towson, MD 21286

June 20 - *Cynthia Fields, MD - Anxiety-related Management of Parkinson's Disease*

July 18 - *Emile Moukheiber, MD - Living Day to Day with Parkinson's Disease*

August 15 - *Kerry Delvin, MT-BC - Music Therapy and Parkinson's Disease*

September 19 - *Amanda Gallagher, CCC-SLP - Surgical Treatments for Parkinson's Disease*

October 17 - *Lynn Choubfeh - Parkinson's Disease and caregiving*

November 21 - *Arita McCoy - 2018 Updates in Parkinson's Disease*

December 19 - *Raj Rajan, MSc., - Q & A*

◆ Surgical Therapeutics for Parkinson's:

Deep Brain Stimulation & Duopa Information Session

Tuesday, November 24th

6:00 p.m. - 8:30 p.m.

St. Thomas Episcopal Church, 1108 Providence Road, Towson, MD 21286

For more information contact Nikki Mennucci- 410-955

◆ Atypical Parkinsonism Support Group

4th Thursday of Every Month

2:00 p.m. - 4:00 p.m.

St. Thomas Episcopal Church, 1108 Providence Road, Towson, MD 21286

Donna DeLeno Neuwirth - 410-616-2811 or ddeleno1@jhmi.edu

◆ Atypical Parkinsonism Support Group - Washington, DC

3rd Saturday of Every Month

2:00 p.m. - 4:00 p.m.

Sibley Memorial Hospital - Bldg. A, 2nd Floor, Room 5

Kristen Weidner, 715-821-3356 or weidner.kristen@gmail.com

◆ Dancing with PD

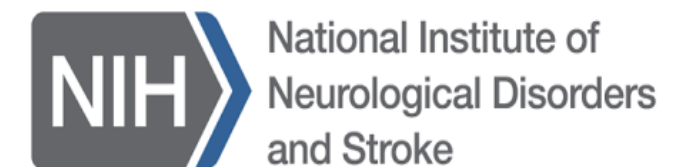
Every Tuesday

1:30p.m. - 3:00 p.m.

Goucher College, Decker Sports and Recreation Center

Todd Dance Studio

1012 Dulaney Valley Road, Towson, MD



Activity & Exercise Programs

◆ Parkinson's Exercise Program - Brick Bodies at Padonia

2430 Broad Avenue, Lutherville Timonium, MD 21093

Free Class; members & non-members at Brick Bodies

Contact: info@marylandparkinsonsupport.org or 443-470-0279

◆ ParkinSonics Community Chorus

Every Wednesday

1:30 p.m. - 3:00 p.m.

Govans Presbyterian Church, Sharp Hall

5828 York Road, Towson, MD 21286

◆ Rock Steady Boxing

Forest Hill Health and Fitness

2217 Commerce Road, Forest Hill, MD 21050

410-893-4153 - Call for class times

◆ Rock Steady Boxing - Lorien Health System

12230 Roundwood Road, Timonium, MD 21093

Please contact: JoAnn Presbitero - jpresbitero@lorienhealth.com or

presbitj@gmail.com or 443-938-3243

Call for class times



Sponsored by the Johns Hopkins PDMD Center, Pacing for Parkinson & the Maryland Association for Parkinson's Support

The Johns Hopkins Parkinson's Disease and Movement Disorders Center

The Johns Hopkins Parkinson's Disease and Movement Disorders Center is dedicated to the tripartite mission of education, research, and excellent care of those living with movement disorders.

Johns Hopkins Outpatient Center
601 North Caroline Street, Suite 5064, Baltimore, MD 21287

410.955.8795

www.hopkinsmedicine.org/neuro/movement

Please consider supporting our center! The work of the Johns Hopkins Parkinson's Disease and Movement Disorders Center would not be possible without the generous support from our patients and the community. For more information about supporting the center, please contact the Development Office at **443-287-7877**.

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Disclaimer: The *Movement Disorder Digest* is published by the Johns Hopkins Parkinson's Disease and Movement Disorders Center to provide timely and useful information. Every effort has been made to verify the accuracy of the content. However, this newsletter is not intended to provide specific medical advice, and individuals are urged to follow the advice of their physicians. The PDMD Center is not responsible for the information or opinions expressed in its articles. If you prefer not to receive fundraising communications from Johns Hopkins Medicine, please contact us at **1-877-600-7783** or **FJHMOptOut@jhmi.edu**. Please include your name and address so that we may honor and acknowledge your request.

Movement Disorder Digest
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JOHNS HOPKINS
MEDICINE

