



March 27, 2009

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## Grant Adjudication Committee Parkinson's Study Group Mentored Clinical Research Award

Dear Committee Members,

I am pleased to submit my application for the PSG Mentored Clinical Research Award. The proposed project "A Pilot Study of Balance and Vitamin D in Persons with Parkinson's Disease (PD)" is an important piece of preparation for an intervention study looking at the effects of vitamin D supplementation on balance and falls in persons with PD. As you are all aware, balance problems and falls become a major cause of morbidity and mortality in later stage PD. Advances in treatments have not lead to an improvement in this symptom. It appears that vitamin D supplementation causes a decrease in falls in elderly fallers but this issue has not been looked at in persons with Parkinson's disease.

Under the mentorship of Dr. Jay Nutt, with co-mentorship from Dr. Fay Horak, this pilot project will lay the ground work for an intervention study to look at the effects of vitamin D supplementation on falls, balance, and strength in persons with PD. The depth of this project could not be carried out at other institutions. Because of the unique expertise and equipment available for gait and balance testing at OHSU this research will not only allow for a better understanding of the effects of vitamin D on balance but also the mechanism through which it does so. OHSU has one of only 3 research level dynamic posturography systems in the world. Dr. Horak is one of the world's leading experts in gait and balance and heads a lab with state of the art equipment and 5 post-doctoral fellows.

This project is ideal for a training level grant. Even if the results are not positive it will give me the opportunity to develop expertise in the use of clinical posturography and broaden my understanding of gait and balance. Gaining this knowledge will position me to transition into an independent researcher in an area of need in PD at a leading if the leading facility in gait research. If the data is positive it may ultimately result in new recommendations for clinical practice, allowing for decreased falls and the associated morbidity and mortality in our PD population.

Thank you for your consideration.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Amie L. Peterson', written in a cursive style.

Amie L. Peterson, MD

Movement Disorders Fellow



**Application Face Page for PSG Scientific Proposals and Studies**  
(Attachment 1)

<b>1. Project Title</b>	A pilot study of balance and vitamin D in persons with Parkinson's disease
<b>2. Principal Investigator(s): (Name and Institution)</b>	Amie Peterson, MD  Oregon Health & Science University (OHSU) and The Portland VA
<b>3. Co-Investigator(s): (Name and Institution)</b>	John G. Nutt, MD  OHSU and The Portland VA
<b>4. Is this a resubmission? (yes/no)</b>	no
<b>5. Note if abbreviated NIH application is attached (yes/no)</b>	yes
<b>6. Note if protocol synopsis is attached (yes/no)</b>	yes
<b>7. If grant application is anticipated, please list name of granting organization or entity.</b>	N/A
<b>8. List proposed grant submission due date.</b>	March 27, 2009
<b>9. Is collaboration with Biostatistics requested? (Required if a clinical trial) If yes, please indicate resources needed.</b>	no
<b>10. If yes to question #9 above, are funds available to support Biostats efforts (including during grant</b>	n/a

<b>application process)?</b>	
<b>11. Is collaboration with the CTCC requested? (Required if a clinical trial) If yes, please indicate resources needed (i.e. data requested for access).</b>	no
<b>12. If yes to question #11 above, are funds available to support CTCC efforts (including during grant application process)?</b>	n/a
<b>13. Estimated project budget.</b>	\$75,000
<b>14. Source of Funding. Note if funding is requested or received.</b>	Oregon Clinical and Translation Research Institute Pilot Grant – (\$15,000) requested
<b>15. Identify any participating “for profit” company/partnership</b>	none
<b>16. Identify any participating “not for profit” company/partnership, including lead institution for project</b>	none
<b>Include any additional background or other information that may help in the review process.</b>	Co-mentor Dr. Fay Horak, Ph.D., PT  Consulting on endocrine issues provided by Dr. Eric Orwoll
<b>For studies not intended as observational:</b> An abbreviated NIH format proposal (max=5 pages) to include the specific aims of the study, background, preliminary studies, research design and methods, plus references, and a protocol synopsis and schedule of activities, is required.	

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## **Abstract**

Vitamin D appears to reduce falls in elderly persons by unclear mechanisms. The primary goal of this pilot study is to see if there is a relationship between vitamin D levels and balance performance in persons with Parkinson's disease (PD). Secondary goals are to gain more information on vitamin D levels and balance performance (as assessed using clinical posturography) in this population. The information from this pilot study will help in design of an intervention study to test the hypothesis that vitamin D supplementation improves balance and reduces falls in persons with PD. This study will also allow for insight into the mechanism through which vitamin D effects falls and balance.

## **Specific Aims**

1. To determine the relationship between low vitamin D levels, poor balance (measured via clinical posturography), and falls in a population with PD.
2. To gather preliminary data on vitamin D levels in a population of subjects with PD and determine the prevalence of vitamin D deficiency.

## **Hypothesis**

Vitamin D deficiency negatively impacts balance, as measured using clinical posturography, and results in increased fall rates in persons with PD.

## **Background & Significance**

PD is a disorder characterized by four cardinal features; tremor, rigidity, slowness, and poor balance. A prospective study by Wood et. al. in 2002 found that over 68% of persons with PD experienced at least one fall over the course of a year.<sup>1</sup> In a study designed to look at the effects of vitamin D and hormone replacement on bone density measures Gallagher et. al. found a significantly lower fall rate in those on vitamin D as compared to placebo.<sup>2</sup> Other researchers noticed similar effects and a meta-analysis in 2004 estimated a 22% decrease in falls in person receiving vitamin D supplementation.<sup>3,4,5</sup>

It is generally hypothesized that vitamin D decreases falls through its effect on muscles, but there also appears to be an improvement in balance, through improvements in sway.<sup>3</sup> Vitamin D receptors are present throughout the brain with a particularly high density in the substantia nigra, one of the primary areas of pathology in PD.<sup>6</sup> Persons with PD have lower serum vitamin D levels and CSF vitamin D binding protein levels than healthy individuals.<sup>7,8</sup> The presence of vitamin D receptors in the brain suggests a central mechanism for effects on balance is very possible. Persons with PD have balance problems with a central nervous system origin and subtle changes may be easier to detect as compared to a population with normal balance.

## **Preliminary Data**

Vitamin D in Men with Osteoporosis: Dr. Peterson presented a poster at a national meeting regarding vitamin D levels in men with and without PD. The data was obtained from a large cohort study of 5,995 men age 65 and older from 6 institutions in the US, The Osteoporotic Fractures in Men (MrOS) study.<sup>9</sup> Vitamin D levels were lower in men with PD compared to controls, 22.8(±6.7) vs. 24.4 (±7.9) ng/ml, this difference was not statistically significant.

Vitamin D and Osteoporosis Assessments in Veterans with PD: Dr. Peterson has an abstract accepted for the 2009 Movement Disorder's Society meeting entitled "Vitamin D and bone

density assessments are rarely obtained in veterans with Parkinson's disease.” Out of a total of 3,128 persons carrying a diagnosis of PD in the VA VISN 20 database, only 236 (7.5%) had a vitamin D level checked during the five year period assessed. This is in spite of the fact that more than three quarters were 70 years or older. Even fewer, 129 ( 4.1%) had bone density testing. The data shows that osteoporosis and its risk factors in PD patients are vastly under assessed within the VA system, despite their increased risk of falls.

**Sensory Organization Test (SOT):** Figure one represents the six scenarios measured in the SOT, using dynamic posturography. By analyzing the different scenarios it is possible to determine if the subject has deficits of the visuospatial, somatosensory, or vestibular system.<sup>10-12</sup> Figure 2 shows data from one of the 6 subjects tested thus far. She performs fairly well on the first 4 scenarios but experiences falls when her somatosensory, in combination with vision or vestibular inputs, are removed. This shows that she uses somatosensory and visual information well but has trouble with vestibular processing. This likely reflects problems with central processing and is similar to results found by others.<sup>13, 14</sup> There is not good data in a PD population, but in persons over 65 SOT, particularly performance on 5 and 6, has been shown to be sensitive in identifying those at high risk for falls.<sup>15</sup> Normative data and standard deviations are available for all the clinical posturography testing.

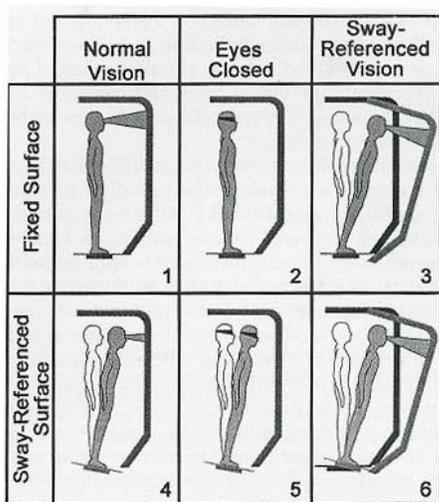


Figure 2: SOT scenarios: 1-3 the surface is fixed and 4-6 the surface moves in response to the subjects' movements (sway-reference). In 1 & 4 the eyes are open, in 2 & 5 the eyes are closed, and in 3 & 6 the surround area moves.

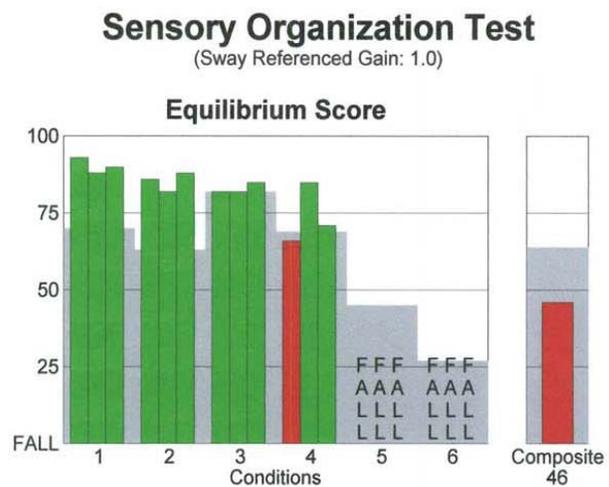


Figure 1: Sample SOT: The green and red bars represent the scores of the subject. The grey shows normal values for this age range. The subject falls with conditions 5 and 6. She has an abnormal composite score.

## **Study Design**

This is a pilot study. We will recruit 40 subjects with idiopathic PD to measure balance and vitamin D levels in preparation for an intervention study. All subjects will undergo a battery of clinical posturography testing, using the dynamic posturography platform(see figure 1) and a long force plate, to determine the best measures of balance deficits. These measures will be compared to the vitamin D levels to look for a correlation between balance and vitamin D in Parkinson's subjects. Based on reports of falls in the month proceeding the testing, subjects will be divided into fallers and nonfallers. The mean of the balance measures and Vitamin D levels will be compared between the 2 groups.

## **Study Population**

Inclusion Criteria: 1. Medically confirmed diagnosis of idiopathic Parkinson's disease by a movement disorders specialist using the National Institute of Neurological disorders and Stroke (NINDS) criteria.<sup>16</sup> 2. Ability to ambulate 50 feet without the assistance of another person. 3. Abnormal push and release test.<sup>17</sup> 4. Ability to cooperate with balance and cognitive testing. 5. Greater than or equal to 21 years of age.

Exclusion Criteria: 1. Significant cognitive deficits as defined by a Mini Mental Status Exam (MMSE) of <25. 2. Another neurological or orthopedic deficit that in the investigator's opinion would have a significant impact on gait (e.g. stroke, fracture). 3. Unstable medical problems.

Plans for recruitment: Potential subjects will be identified through the movement disorders clinics at OHSU and the Portland VA. Flyers describing the study will also be posted at OHSU and the VA.

## **Study Procedures**

Balance Measures: Assessments will occur approximately half way between Parkinson's disease medication doses for those on medications or at any time for those who are not medicated. The PI, Amie Peterson, or a trained physical therapist will perform the posturography. The testing will take place on the 8th Floor in Rehab Services in the main hospital. The following balance tests have been selected based on the likelihood that they will be sensitive to balance deficits in PD. An overall composite score will be generated using the 6 specific measure detailed below as a percentage of age matched norms, which are already available for the clinical posturography testing. If someone scores the same as age matched controls on each test the total score would be 6.

### **Posturography - Dynamic Platform:**

1.Sensory Organization Test (SOT): The SOT quantifies abnormalities in the three sensory systems that contribute to postural control (somatosensory, visual and vestibular) as well as the brain's central integration of these. This test produces an overall composite score which will be used in the analysis.

2.Backwards Translations: Measures latency of each leg with medium and large backward perturbations, as well as symmetry, amplitude, scaling and force of responses . This test produces a single composite score from the 4 measures of latency which will be used in the analysis.

**Posturography - Long Force Plate Testing:**

**3.Unilateral Stance with Eyes Open and Closed:** This test quantifies mean sway velocity and symmetry of sway while standing on one leg with eyes open and closed. The higher sway velocity (right or left) with eyes closed and eyes opened will be used in the analysis, generating 2 measures.

**4.Sit to stand:** Measure the time to move center of gravity (COG) over the feet, the amount of force exerted by the legs during the rise phase, sway velocity (COG sway) and weight symmetry both during the sit to stand and for 5 seconds afterwards. The COG sway velocity will be used in the analysis.

**5.Walk and turn:** Measure the turn time (amount of time to complete 180 degree turn while walking) and sway while turning for turns to the right and to the left. The slower turn time and higher turn sway (right or left) will be used in the analysis.

**Falls assessment:** Will be asked how often they have fallen in the last month.

**Vitamin D Levels:** Approximately 3 ml of blood will be drawn by OCTRI staff and frozen and stored until the conclusion of the study to keep the investigators blinded to the Vitamin D levels. 25-hydroxyvitamin D (25-OHD) will be checked on serum samples at the conclusion of the study. Subjects will be contacted at the end of the study by phone and notified of their vitamin D levels. If it is less 30ng/ml they will be told this is considered low and it will be suggested that they follow up with their primary care doctor for management.

**Cognitive battery:** 1. Mini Mental Status (MMSE) Examination, 2.Trail Making Test parts A and B, 3.Verbal fluency (naming as many animals as possible in 1 minute), 4. Clock draw.

**Motor function:** Unified Parkinson's Disease Rating Scale (UPDRS) motor score.

**Medication list:** Subject will be asked about their prescription medications and over-the-counter supplements.

**Dyskinesia Assessment:** Modified Abnormal Involuntary Movement Scale (mAIMS)

**Physical Activity Score:** This will be quantified using the Physical Activity for the Elderly (PASE). This is a paper questionnaire and takes about 5 minutes to complete.

**Timetable and organizational chart**

Prior to study visit	Recruitment		
<b>Study Visit</b> (80 minutes)	<b>Consent</b> (5 minutes)	<b>Possible Confounders:</b> (30 minutes) <ul style="list-style-type: none"><li>• Cognitive battery</li><li>• Motor UPDRS</li><li>• Medication list</li><li>• Modified AIMS</li></ul>	<b>Measures:</b> (45 minutes) <ul style="list-style-type: none"><li>• Falls Assessment</li><li>• PASE assessment</li><li>• Balance measures</li><li>• Blood Draw (1 tsp)</li></ul>
After Completion of Study	Contact subjects with vitamin D level	Send vitamin D level if abnormal to PCP	

**Statistical Analysis**

Specific aim 1: Linear regression analyses will be performed comparing vitamin D levels to the overall composite score as well as individual regressions for each of the 6 measures from the balance testing (see the methods section for the specific measures to be used in the analysis). These results will also be adjusted for disease severity as measured by the UPDRS motor score. The subjects will then be divided into fallers and nonfallers. Linear regressions comparing dynamic posturography measures and vitamin D levels between these 2 groups will be carried out, again with adjustments for disease severity(motor UPDRS) and physical activity (PASE score). Primary analyses above adjust for the most critical confounders; secondary analyses for each comparison will incorporate additional potential confounders: medication that may worsen balance and cognition (one at a time) to assess their impact on the above relationships.

Specific aim 2: To determine the prevalence of vitamin D deficiency in subjects with PD, the levels will be measured and the percent of subjects with deficient (<20ng/ml), insufficient ( $\geq 20$ ng/ml - < 30ng/ml), and sufficient ( $\geq 30$ ng/ml) vitamin D 3 levels will be calculated. 95% confidence intervals for the percentages of subjects in each Vitamin D category will be obtained. Secondary analysis will incorporate the season of the blood draw and vitamin D supplementation to allow evaluation based on these factors as well.

Power calculations: The association between the composite and individual balance measures and vitamin D levels is based on regression/correlation analysis. A sample size of 40 provides 80% power to detect a correlation of 0.43 or higher. All power calculations are using an alpha of 0.05 and based on 50% being fallers, as seen in prior studies of persons with abnormal push and release testing.<sup>17</sup> Subjects will also be analyzed by dividing them into fallers and nonfallers. If there is a difference in one standard deviation(SD) of the dynamic posturography measures in the fallers and nonfallers this would be detected with 32 subjects with 80% power (see table 1). It is clear in young nonfallers that 2 SD is clinically significant and likely that 1 SD is significant for fallers.<sup>18</sup> 10ng/ml is the division between sufficient, insufficient, and deficient categories for bone health and clearly a clinically significant difference. Our sample size is more than adequate to detect such a difference between fallers and nonfallers and allows for a much smaller difference to be detected, 3 ng/ml (see table 2). With a sample of size 40 in this pilot study we will also be able to obtain reasonable descriptive information on all measures in order to plan a larger (confirmatory) study.

Table 1: Dynamic Posturography Measures

Power	Alpha	Difference in SOT composite	Sample size
0.7	0.05	1 SD	26 (13,13)
0.8	0.05	1 SD	32 (16,16)
0.9	0.05	1 SD	44(22,22)

Table 2: Vitamin D Levels

Power	Alpha	Difference in Vit D levels(ng/ml)	Sample size
0.8	0.05	5	14 (7,7)
0.8	0.05	4	22 (11,11)
0.8	0.05	3	36(18,18)

Based on Vitamin D of 8.9( $\pm 3.2$ ) ng/ml<sup>19</sup>

## Resources and Environment

Dr. Peterson has offices and networked computer resources at both OHSU and the VA . Clinical space is available through the Oregon Clinical and Translational Research Institute (OCTRI) which is located on the OHSU campus, in a building connected to the University and VA hospitals. It is equipped with 10 self-contained clinic rooms that can be used for subject consent, examination, and testing. The equipment for the clinical posturography is located near the OCTRI, on the 8<sup>th</sup> floor of the main hospital, within the physical therapy department. It is one of only three research level clinical posturography systems in the world, including additional force plates, ability for new testing programs to be developed in addition to the standard battery, and raw data can be looked at in more detail. The expanded capacity is crucial in gaining greater insight in the mechanism by which vitamin D effects balance.

Dr. Peterson also has strong mentoring resources. Dr. Nutt is a very experienced researcher in clinical trials involving many areas of Parkinson's disease and has done a number of research projects focused on gait and balance in these patients. He meets weekly with Dr. Peterson at the movement disorders journal club and more casually in the movement disorders clinic. Dr. Nutt and Dr. Peterson coauthored a paper on neurotrophic factors in PD. He has been very involved in the review of her work on dopamine antagonists in VA patients with PD. Dr. Horak is one of the world's foremost experts in gait and balance research and has completed a number of studies particularly focused on PD patients. She has been instrumental in the decisions regarding balance testing selection and analysis for this project. Her training in both neuroscience and in physical therapy allows for great collaboration. She also has a number of postdoctoral fellows who have been of assistance. Dr. Peterson has more intermittent contact with members of the endocrinology department. Dr. Orwoll is the director of the Oregon Clinical and Translational Research Institute (OCTRI), the Bone and Mineral Clinic, and the Bone Density Lab within the endocrinology department. He is a world leader in calcium metabolism, particularly in men and is the primary investigator for MrOS (a cohort of almost 6,000 subjects).<sup>9</sup> The poster Dr. Peterson presented on vitamin D in men with osteoporosis came from a collaboration using data from a this cohort.

## **Human Subjects**

### **Potential Risks**

There is minimal risk involved in the proposed research. The blood draw may result in slight pain, bleeding, bruising, or infection. To decrease the likelihood of such complications, all blood draws will be performed by trained phlebotomist. There is a risk that subjects may fall when taking the balance tests. To reduce this risk, subjects will be placed in a safety harness for the tests with the moveable platform. This is a device that wraps around the subjects' shoulders, waist, and legs, and is attached at the shoulders to the equipment. In addition, a technician will stand within arm's length of the subject during the testing and will brace the subject if needed. To protect confidentiality, each subject will be identified with a unique numerical identifier, which will be used for all testing. The data will be kept in a locked file cabinet in a locked office when not being used. Banked blood will be labeled with a unique numerical identifier and will be kept in a secure lab.

### **Potential Benefit of Proposed Research to Human Subject and Others**

All subjects participating will be informed of their vitamin D level at the completion of the study. Vitamin D deficiency and insufficiency often goes unrecognized. On a recent review of VISN20 data less than 8% of persons with PD had ever had a vitamin D level checked. The information obtained, seeing if vitamin D improves balance in PD, is important for the subjects involved. Most persons with PD experience balance difficulties at some point in time and the more data that is known the better their management will be when that time comes. It is also possible that an individual subjects testing will reveal a balance disorder of a different etiology that could result in additional treatment and improvement.

### **Recruitment and Informed Consent**

Subjects will be recruited at the Portland Veterans Affairs (VA) Hospital and OHSU movement disorders clinics. The Parkinson's Disease Research, Education & Clinical Center (PADRECC) at the Portland VA and the Parkinson's Center of Oregon (PCO) at OHSU, both have good records of recruiting and enrolling PD patients in research protocols. The PADRECC and PCO saw 480 and 585 patients with PD respectively in the last year; this does not include additional research subjects who are not seen clinically. A recent study on falls recruited 105 patients over an 18 month period. Potential subjects will also be recruited through flyers that will be posted in patient waiting areas in the VA and OHSU.

Dr. Peterson will obtain informed consent, informing persons who meet subject criteria about the details of the study and will invite them to sign a consent form before participating. Potential subjects will be told that their participation or lack of participation will not affect the clinical care they receive.

## Literature Cited

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DETAILED BUDGET FOR INITIAL BUDGET PERIOD DIRECT COSTS ONLY						FROM 7/1/09	THROUGH 6/30/10	
PERSONNEL <i>(Applicant organization only)</i>		Months Devoted to Project			INST. BASE SALARY	DOLLAR AMOUNT REQUESTED <i>(omit cents)</i>		
NAME	ROLE ON PROJECT	Cal. Mnths	Acad. Mnths	Summer Mnths		SALARY REQUESTED	FRINGE BENEFITS	TOTAL
Amie Peterson, MD	PD/PI	3.6			██████	██████	██████	██████
April Wilson, BS	Coordinator	3			██████	██████	██████	██████
Statistician, TBA	Statistician	.36			██████	██████	██████	██████
John Nutt, MD	Mentor	.6			██████	0	0	0
<b>SUBTOTALS</b> →						██████	██████	██████
CONSULTANT COSTS								
EQUIPMENT <i>(Itemize)</i>								
SUPPLIES <i>(Itemize by category)</i> Office and coordinator supplies: study binders and dividers								
								100
TRAVEL To national meeting to present poster								
								1,657
PATIENT CARE COSTS		INPATIENT						
		OUTPATIENT						
ALTERATIONS AND RENOVATIONS <i>(Itemize by category)</i>								
OTHER EXPENSES <i>(Itemize by category)</i> Balance testing, 35 patients at \$100 per patient = \$3,500 Vitamin D testing, 35 patients at \$91.94 per patient = \$3,218 Manuscript development and publishing costs = \$700								
								7,418
CONSORTIUM/CONTRACTUAL COSTS						DIRECT COSTS		
<b>SUBTOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD</b> <i>(Item 7a, Face Page)</i>								<b>\$ 75,000</b>
CONSORTIUM/CONTRACTUAL COSTS						FACILITIES AND ADMINISTRATIVE COSTS		
<b>TOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD</b>								<b>\$ 75,000</b>

## **Budget Justification**

### **Personnel:**

The majority of the funds requested will be used for personnel expenses, as described below.

Dr. Amie Peterson will be responsible for recruiting and enrolling subjects with the assistance of the study coordinator. The balance testing will be performed by the physical therapist but all other cognitive and clinical testing will be carried out by Dr. Peterson. She will also perform the data analysis with assistance from the statistician as needed.

April Wilson will perform the clinical research coordinator activities. She will assist Dr. Peterson with recruitment efforts, schedule study subjects for testing and blood draws, perform regulatory duties such as IRB submissions, and maintain study binders. Effort at .25 FTE is requested for this position.

The biostatistician, TBA, as part of the Oregon Clinical and Translational Research Institute (OCTRI) biostatistics unit will be available for consultation and analysis. This person will provide guidance to Dr. Peterson in respect to the data management, statistical analysis, and publication summaries and graphs for the resulting publications. Support is requested at 3% effort.

Dr. Nutt will mentor Dr. Peterson throughout the research process and through manuscript preparation. Support is requested at 5% effort.

### **Other:**

Additional support is requested for office supplies, patient care costs, travel, and manuscript publishing.

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME <b>Amie Peterson</b>	POSITION TITLE <b>fellow (current), instructor (future)</b>
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Pennsylvania State University – University Park, PA	B.S.	1996	Biochemistry
The Medical College of Georgia – Augusta, GA	M.D.	2001	Medicine
Brown University - Providence, RI		2002	Internal Medicine
Brown University – Providence, RI		2005	Neurology
Office of Senator Jack Reed – Washington, DC		2006	Health Policy
UMass University – Worcester, MA		2007	Movement Disorders
Portland VA/ OHSU – Portland, OR		2009	Movement Disorders

### A. Positions and Honors.

#### Positions and Employment:

2001-2002 Brown University	Providence, RI	Medicine Intern
2002-2005 Brown University	Providence, RI	Neurology Resident
2005-2006 The Office of Senator Jack Reed	Washington, DC	Health Policy Fellow
2006-2007 UMass University	Worcester, MA	Movement Disorder's
Fellow		
2007-present Portland VA and OHSU	Portland, OR	Movement Disorder's
Fellow		

#### Other Experience and Honors:

May 1998      John A. Hartford/ AFAR Scholarship – Harvard University  
A summer program for medical students; sponsored by the American Federation on aging Research; consisting of lectures, clinical experience, and research involvement in the area of geriatric medicine. I was involved in a research project of exercise intervention on a community dwelling elderly population, in developing a study protocol to look at the effects of antipsychotics on gait patterns in the elderly, and in compiling a literature review on gait patterns in ALS patients.

April 1999      Dean's Fellowship Award - Medical College of Georgia  
A grant for medical students to carry out independent research. My specific project was a qualitative investigation of the medical decision making process in elderly patients with and without cognitive impairment with a focus on end of life issues.

May 2005      Haffenreffer Award - Road Island Hospital  
A monetary award to recognize excellence in the areas of research, professionalism, and teaching in senior residents.

**B. Selected peer-reviewed publications (in chronological order).**

1.Hausdorff JM, Lertratanakul A, Cudkowicz ME, Peterson AL, Kaliton D, Goldberger AL. Dynamic Markers of Altered Gait Rhythm in Amyotrophic Lateral Sclerosis. *Journal of Applied Physiology*. 2000 June; 88(6): 2045-532.

2.Peterson, AL and Nutt JG. Treatment of Parkinson's Disease with Trophic Factors. *Neurotherapeutics*. 2008 April; 5(2): 270-280.

**C. Peer-reviewed abstracts**

Peterson AL, Quinn JF, Andrews M, Nutt JG. Dopamine blocker use in Portland VA. Accepted for presentation at the 11<sup>th</sup> International Congress of Parkinson's disease and Movement Disorders, June 2008.

Peterson AL, Fink H, Quinn JF, Barrett-Connor E, Shikany J, and Orwoll E for the Osteoporotic Fractures in Men (MrOS) Research Group. Vitamin D Levels In Men with Parkinson's Disease. Accepted for presentation at the Parkinson's Study Group 22nd Annual Symposium on Etiology, Pathogenesis, and Treatment of Parkinson's Disease and Other Movement Disorders, September 2008.

Peterson AL, Quinn JF, Andrews M, Nutt JG. Dopamine antagonist prescribing practices to persons with Parkinson's disease (PD). Accepted for presentation at the 2009 American Academy of Neurology annual meeting, April 2009.

Peterson AL, Duckart JP, Quinn JF, Nutt JG. Vitamin D and bone density assessments are rarely obtained in veterans with Parkinson's disease Accepted for presentation at the 2009 12<sup>th</sup> International Congress of Parkinson's disease and Movement Disorders, June 2009.

**D. Research Support.**

Unfunded (Peterson – PI)

January 2009 – present

A pilot study of vitamin D and balance in Parkinson's disease.

The goal of this project is to determine the correlation between vitamin D levels and balance performance (using clinical posturography) in a population with Parkinson's disease.

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## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

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NAME John G. Nutt, MD	POSITION TITLE Professor of Neurology and Physiology & Pharmacology
eRA COMMONS USER NAME	

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Rice University, Houston, TX	B.A.	1965	Biochemistry
Baylor College of Medicine, Houston, TX	M.S.	1970	Pharmacology
Baylor College of Medicine, Houston, TX	M.D.	1970	Medicine

### A. POSITIONS AND HONORS

#### Employment

1970-1971	Intern in Internal Medicine, University of Oregon Medical School, Portland, OR
1971-1973	PHS Staff Physician, Nat. Inst. Mental Health, Addiction Res. Ctr., Lexington, KY
1973-1976	Resident in Neurology, University of Washington Medical School, Seattle, WA
1976-1978	Clinical Associate, Experimental Therapeutics Branch, NINCDS, Bethesda, MD
1978-1984	Asst. Professor, Neurology & Pharmacology, Oregon Health & Science University, Portland, OR
1984-1988	Assoc. Professor, Neurology & Pharmacology, Oregon Health & Science University, Portland, OR
1988-Pres.	Professor, Neurology, Oregon Health & Science University, Portland, OR
1991-1995	Professor, Pharmacology, Oregon Health & Science University, Portland, OR
1995-Pres.	Professor, Physiology and Pharmacology, Oregon Health & Science University, Portland, OR
2001-Pres.	Director, Parkinson Disease Research Education & Clinic Center (VA PADRECC), Portland, OR

#### Honors And Awards

1994-Present	“The Best Doctors in America”
2001-2004	Chair, AAN Movement Disorders Section

### B. PUBLICATIONS (selected from 160 peer reviewed journal articles)

1. Nutt JG, Woodward WR, Hammerstad JP, Carter J, Anderson JL. “On-Off” phenomenon in Parkinson’s disease: Relationship to L-DOPA absorption and transport. N Engl J Med 1984; 310(8):483-488.
2. Nutt JG, Fellman JH. Pharmacokinetics of L-DOPA. Clin Neuropharmacol 1984; 7(1):35-49.
3. Nutt JG, Hammerstad JP, deGarmo P, Carter J. Cranial dystonia: Double-blind crossover study of anticholinergics. Neurology 1984;34:215-217.
4. Nutt JG, Woodward WR, Anderson JL. Effect of carbidopa on pharmacokinetics of intravenous levodopa: Implications for mechanisms of therapeutic actions of levodopa and carbidopa. Ann Neurol 1985; 18:537-543.
5. Nutt JG, Woodward WR. Levodopa pharmacokinetics and pharmacodynamics in fluctuating parkinsonian patients. Neurology 1986; 36:739-744.
6. Gancher ST, Nutt JG, Woodward WR. Peripheral pharmacokinetics of levodopa in untreated, stable, and fluctuating parkinsonian patients. Neurology 1987; 37:940-944.
7. Gancher ST, Nutt JG, Woodward WR. Response to brief levodopa infusions in Parkinsonian patients with and without motor fluctuations. Neurology 1988; 38: 712-716.

## **Publications (cont.)**

8. Gancher ST, Woodward WR, Boucher B, Nutt JG. Peripheral pharmacokinetics of apomorphine in humans. Ann Neurol 1989;26:232-238.
9. Hammerstad JP, Woodward WR, Gliessman P, Boucher B, Nutt JG. L-Dopa pharmacokinetics in plasma and cisternal and lumbar CSF of monkeys. Ann Neurol 1990;27:495-499.
10. Gancher ST, Woodward WR, Gliessman P, Boucher B, Nutt JG. The short-duration response to apomorphine: Implications for the mechanism of dopaminergic effects in parkinsonism. Ann Neurol 1990;27:660-665.
11. Nutt JG. Levodopa-induced dyskinesia: Review, observations and speculations. Neurology 1990;40:340-345.
11. Nutt JG, Woodward WR, Carter JH, Gancher ST. Effect of long-term therapy on the pharmacodynamics of levodopa: Relation to on-off phenomenon. Arch Neurol 1992;49:1123-1130.
12. Grandas F, Gancher ST, Rodriguez M, Lera G, Nutt JG, Obeso JA. Differences in the motor response to apomorphine between untreated and fluctuating patients with Parkinson's disease. Clin. Neuropharmacol 1992;15:13-18.
13. Gancher ST, Nutt JG, Woodward WR. Time course of tolerance to apomorphine in parkinsonism. Clin Pharmacol Ther 1992;52:504-510.
14. Horak FB, Nutt JG, Nashner LM. Postural inflexibility in parkinsonian subjects. J Neurol Sci 1992;111:46-51.
15. Woodward WR, Olanow CW, Beckner BS, Hauser RA, Gauger LL, Cedarbaum JM, Nutt JG. The effect of L-DOPA infusions with and without phenylalanine challenges in parkinsonian patients: plasma and ventricular CSF L-DOPA levels and clinical responses. Neurology 1993;43:1704-1708.
16. Nutt JG, Marsden CD, Thompson PD. Human walking and higher level gait disorders, particularly in the elderly. Neurology 1993;43:268-279.
17. Burleigh AL, Horak SB, Burchiel KJ, Nutt JG. Effects of thalamic stimulation on tremor, balance, step initiation: A single subject study. Movement Disorders 1993;8:519-524.
18. Browne DL, Gancher ST, Nutt JG, Brunt ERP, Smith EA, Kramer P, Litt M. Episodic ataxia/myokymia syndrome is associated with point mutations in the human potassium channel gene, KCNA1. Nature Genetics 1994;8:136-140.
19. Nutt JG, Woodward WR, Beckner RM, et al. Effect of peripheral catechol-o-methyltransferase (COMT) inhibition on the pharmacokinetics and pharmacodynamics of levodopa in parkinsonian patients. Neurology 1994;44:913-919.
20. Burleigh A, Horak F, Nutt J, Frank J. Levodopa reduces muscle tone and lower extremity tremor in Parkinson's disease. Can J Neurol Sci 1995;22:280-285.
21. Nutt JG, Carter JH, Woodward WR. Long duration response to levodopa. Neurology 1995;45:1613-1616.
22. Maricle RA, Nutt JG, Valentine RJ, Carter JH. Dose-response relationship of levodopa with mood and anxiety in fluctuating Parkinson's disease: A double-blind, placebo-controlled study. Neurology 1995;45:1757-1760.
23. Gancher ST, Nutt JG, Woodward WR. Apomorphine infusional therapy in Parkinson's disease: Clinical utility and lack of tolerance. Mov Disord 1995;10:37-43.
24. Horak FB, Frank JS, Nutt J. Effects of dopamine on postural control in Parkinsonian subjects: Anticipatory postural responses. J Neurophysiol 1996;75:2380-2396.
25. Nutt JG, Holford NHG. The response to levodopa in Parkinson's disease: Imposing pharmacological law and order. Ann Neurol 1996;39:561-573.
26. Burleigh-Jacobs A, Horak FB, Nutt JG, Obeso JA. Step initiation in Parkinson's disease: Influence of levodopa and external sensory triggers. Mov Disord 1997;12:206-15.
27. Nutt JG, Carter JH, Lea ES, Woodward WR. Motor fluctuations during continuous levodopa infusions in patients with Parkinson's disease. Mov Disord 1997;12:285-292.
28. Nutt JG, Carter JH, Van Houten L, Woodward WR. Short- and long-duration responses to levodopa during the first year of levodopa therapy. Ann Neurol 1997;42:349-355.
29. Camicioli R, Oken BS, Sexton G, Kaye JA, Nutt JG. Verbal fluency task affects gait in Parkinson's disease with motor freezing. J Geriatr Psychiatry Neurol 1998;11:181-185.
30. Horak, FB, Jones C, Nutt JG. Patients with Parkinson's disease persevere postural adjustments for compensatory stepping. Neurology Report 1998;22:180-181.
31. Frank JS, Horak FB, Nutt JG. Centrally-initiated postural adjustments in parkinsonian patients on and off Levodopa. J. Neurophysiol 2000;84:2440-2448.

### **Publications (cont.)**

32. Rascol O, Blin O, Thalamas C, et al. ABT-431, a D1 receptor agonist pro-drug, has efficacy in Parkinson's disease. Ann Neurol 1999;45:736-741.
33. Nutt JG, Carter JH. Apomorphine can sustain the long-duration response to L-DOPA in fluctuating PD. Neurology 2000;54:247-250.
34. Nutt JG, Lea ES, Schuff RA, Sexton GJ. Determinants of tapping speed in normal controls and Parkinson's disease subjects: Differing effects of brief and continued practice. Mov. Disord 2000;15:843-849.
35. Rascol O, Nutt JG, Blin O, Goetz CG, Trugman JM, Soubrouillard C, Carter JH, Currie LJ, Fabre N, Thalamas C, Giardina WJ, Wright S. Induction by Dopamine D1 Receptor Agonist ABT-431 of dyskinesia similar to L-DOPA in Patients w/ Parkinson's Disease. Arch. Neurol 2000;58:249-254.
36. Nutt JG, Nygaard TB. Response to levodopa treatment in dopa-responsive dystonia. Arch Neurol 2001;58:905-910.
37. Nutt JG, Rufener SL, Carter JH, Anderson VC, Pahwa R, Hammerstad JP, Burchiel KJ. Interactions between deep brain stimulation and levodopa in Parkinson's disease. Neurology 2001;57:1835-1842.
38. Nutt JG, Carter JH, Lea ES, Sexton GJ. Evolution of the response to levodopa during the first four years of therapy. Ann. Neurol. 2002;51(6):686-693.
39. Nutt JG, Burchiel KJ, Comella CL, Jankovic J, Lang AE, Laws ER, Lozano AM, Penn RD, Simpson RK, Stacy M, Wooten GF, ICV GDNF Study Group. Randomized, double-blind trial of glial cell line-derived neurotrophic factor (GDNF) in PD. Neurology 2003;60:69-73.
40. Dimitrova D, Horak FB, & Nutt JG. Postural muscle responses to multidirectional translations in patients with Parkinson's disease. J Neurophysiol 2004;91:489-501.
41. Dimitrova D, Nutt J, Horak FB. Abnormal force patterns for multidirectional postural responses in patients with Parkinson's disease. Exp Brain Res 2004;156(2):183-195.
42. Nutt JG, Carter, JH & Sexton, GJ. The dopamine transporter: Importance in Parkinson's disease. Annals of Neurology 2004;55:766-773.
43. Dimitrova D, Horak FB, and Nutt JG. Directional-specific postural instability in subjects with Parkinson's disease. Exp Neurol. 2005 Jun;193(2):504-21.
44. Nutt JG, Wooten GF. Clinical practice. Diagnosis and initial management of Parkinson's disease. N Engl J Med. 2005 Sep 8;353(10):1021-7.
45. Jacobs JV, Dimitrova DM, Nutt JG, Horak FB. Can Stooped Posture Explain Multi-directional Postural Instability in Patients with Parkinson's Disease? Experimental Brain Research. Exp Brain Res. 2005 Sep;166(1):78-88.
46. Horak FB, Dimitrova D, Nutt JG. Directional-specific postural instability in subjects with Parkinson's disease. Experimental Neurology. 2005 Jun;193(2):504-21.
47. Jacobs JV, Horak FB, Tran VK, Nutt JG. Multiple balance tests improve the assessment of postural stability in subjects with Parkinson's disease. Journal of Neurology, Neurosurgery, & Psychiatry 2006 Mar;77(3): 322-326.
48. Jacobs JV, Horak FB, Van Tran K, Nutt JG. An alternative clinical postural stability test for patients with Parkinson's disease. Journal of Neurology. 2006 Jun 20; In Press.
49. Nutt JG. Continuous dopaminergic stimulation: Is it the answer to the motor complications of Levodopa? Movement Disorders 2006 Sept.
50. Holford NH, Chan PL, Nutt JG, Kieburtz K, Shoulson I; Parkinson Study Group. Disease progression and pharmacodynamics in Parkinson disease - evidence for functional protection with levodopa and other treatments. Journal of Pharmacokinetics and Pharmacodynamics 2006 Jun;33(3):281-311.
51. Gurfinkel V, Cacciatore T, Cordo PJ, Horak F, Nutt J, Skoss R. Postural muscle tone in the body axis of healthy humans. Journal of Neurophysiology 2006; 96:2678-2687.
52. Chan LS, Nutt JG, Holford NHG. Levodopa Slows Progression of Parkinson's Disease. External Validation by Clinical Trial Simulation. Pharmaceutical Research. 2007; 24 791-802.
53. Nutt JG, Carter JH, Carlson NE. Effects of methylphenidate on response to oral levodopa: a double-blind clinical trial. Archives of Neurology. 2007; 64:319-23.

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME <b>Fay B. Horak, Ph.D., PT</b> eRA COMMONS USER NAME (credential, e.g., agency login)	POSITION TITLE <b>Senior Scientist</b>		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Wisconsin, Madison, WI	BS	1973	Physical Therapy
University of Minnesota, Minneapolis	MS	1977	Neurophysiology
University of Washington, Seattle, WA	PhD	1982	Physiology & Biophys
RS Dow Neurological Sciences Inst., Portland,	Post-doc	1982-85	Motor Control

### A. Positions and Honors.

1986- pres. Assistant Scientist (1986-1989), Associate Scientist (1989-1992), and Senior Scientist/Professor (1992-present) Neurological Sciences Institute and Depts of Neurology, Physiology & Pharmacology and Biomedical Engineering, Oregon Health & Science University (OHSU), Portland, OR

1973- 1977 Physical Therapist North Memorial Med. Center & Golden Valley Hospital, Minneapolis, MN

#### Federal Government Public Advisory Committees:

2001 – 2006 Member of Subcommittee for National Center for Medical Rehabilitation Research of NICHD

2000 Ad Hoc NIH Study Section Member NINDS

1999 – 2001 NIH Study Section Member, NIH Biobehavioral and Behavioral Processes (BBBP7)

1999 Scientific Advisory Committee, Neurovestibular Research of Astronauts, NASA, League City, TX

1998 Scientific Advisor, Clinical Sciences Special Emphasis Panel, National Institutes of Health, “Balance Disorders and Anxiety,” NIDCD Workshop

1997 Scientific Advisor, Spatial Orientation Committee, Aging and Space Flight: Universities Space Research Association: Division of Space Life Sciences, Sponsored by NASA & NIA

1996 Chair, National Strategic Research Plan in Balance Disorders, NIDCD

#### Honors and Other Professional Activities:

2006 Founding member of the Academy of the Oregon Clinical and Translational Science Inst

2004 NIH Merit Award for 25 years of continuous grant funding from Nat Inst on Aging

2003 OHSU Distinguished Faculty Award for Outstanding Collaboration

2003-2009 First Elected President of International Society for Posture and Gait Research

2000 Honorary Professor, Bangkok, Thailand

1999 Honorary Visiting Professor, Department of Physical Therapy, Tel Aviv University

1992 National Neurology Section Researcher, American Physical Therapy Association (APTA)

1989 Marian Williams National Research Award, 5<sup>th</sup> awarded in history of APTA

### 1974- Selected peer-reviewed publications (in chronological order).

King, L.A., **Horak, F.B.** Lateral stepping for postural correction in Parkinson’s disease. Arch Phys Med, Vol 89, March 2008 492-499.

- Jacobs, J.V., Fujiwara, K., Tomita, H., Furune, N., Kunita, K., **Horak, F.B.** Changes in the activity of the cerebral cortex relate to improved stability of postural responses when warned of a perturbation. Clinical Neuro Phys Jun; 119(6):1431-1442, 2008. PMID: PMC244373
- Cameron, M., **Horak, F.B.**, Herndon, R.R. Imbalance in multiple sclerosis: a result of slowed spinal somatosensory conduction. Somatosensory and Motor Research. 25(2): 113-22, 2008. (PMID: 18570015)
- Mancini, M., Rocchi, L., **Horak, F.B.**, Chiari, L. Effects of Parkinson's disease and levodopa on functional limits of stability. Clinical Biomechanics 23:450-458, 2008.
- Van Ooteghem, K., Frank, J.S., Allard, F., Buchanan, J., Oates, A.R., **Horak, F.B.** Compensatory postural adaptations during continuous, variable amplitude perturbations reveal generalized rather than sequence-specific learning. Experimental Brain Research 187(4): 603-11, 2008.
- Mancini, M, Rocchi, L, **Horak, FB**, Chiari, L. Effects of Parkinson's disease and levodopa on functional limits of stability. Clinical Biomechanics. 2007 (In Press)
- Wright WG, **Horak FB**. Interaction of posture and conscious perception of gravitational vertical and surface horizontal. Exp Brain Res. 2007 Sept; 182(3):321-32.
- Jacobs JV, **Horak FB**. Cortical control of postural responses. J Neural Transm. 2007 Oct; (10):1339-48
- Jacobs JV, **Horak FB**. External postural perturbations induce multiple anticipatory postural adjustments when subjects cannot pre-select their stepping foot. Exp Brain Res. 179(1): 29-42, 2007.
- Fujiwara, K, Kiyota, T, Maeda, K, Horak, FB. Postural Control Adaptability to floor oscillation in the elderly. J. of Physiological Anthropology, 2007 Jun; 26(4): 485-93.
- Kluzik, J., **Horak, FB**, Peterka, R.J. Adaptation of postural orientation to changes in surface inclination. Exp Brain Res 2007, Mar; 178(1):1-17.
- Dozza, M., **Horak, FB**, Chiari, L. Auditory biofeedback substitutes for loss of sensory information in maintaining stance. Exp Brain Res 2007 Mar; 178(1): 37-48.
- Wright, GW, Gurfinkel, V, King, L, **Horak, F**. Parkinson's disease shows perceptuomotor asymmetry unrelated to motor symptoms. Neuroscience Letters 471 10-15. 2007.
- Kluzik, J, **Horak, FB**, Peterka, RJ. Postural after-effects of stepping on an inclined surface. Neurosci Letters 2007, Feb 14; 413 (2): 93-8.
- Kluzik, J, **Horak, FB**, Peterka, RJ. Adaptation of postural orientation to changes in surface inclination. Exp Brain Res 2007, Mar; 178(1): 1-17.
- Hlavacka, F and **Horak, FB**. Somatosensory influence on postural response to galvanic vestibular stimulation. Physiol. Res 55 (Suppl. 1): S121-S127, 2006.
- Dozza, M, Chiari, L, Hlavacka, F, Cappello, A, **Horak, FB**. Effects of Linear versus Sigmoid Coding of Visual or Audio Biofeedback for the Control of Upright Stance. IEEE Transactions Vol 14, No. 4, Dec 2006.
- Scholz JP, Schoner G, Hsu WL, Jeka JJ, **Horak F**, Martin V. Motor equivalent control of the center of mass in response to support surface perturbations, Exp. Brain Research, 2007 (In Press).
- Dozza, M, **Horak, F**, Chiari, L. Auditory biofeedback substitutes for loss of sensory information in maintaining stance Exp. Brain Research In Press, 2006.
- Rocchi, L, Chiari, L, Mancini, M, Carlson-Kuhta, P, Gross, A, **Horak, F**. Step initiation in Parkinson's disease: influence of initial stance conditions. 2006, Neuroscience Letters, 406: 128-132 .
- Kluzik, J, Peterka, R, **Horak FB**. Adaptation of postural orientation to changes in surface inclination. Exp Brain Research, 2006 (In Press)
- Jacobs, J.V, **Horak, FB**. Abnormal proprioceptive-motor integration contributes to hypometric postural responses of subjects with Parkinson's disease Neuroscience. 2006 Aug 21;141(2):999-1009
- Jacobs, JV, **Horak, FB**, Tran, VK, Nutt, JG. Multiple balance tests improve the assessment of postural stability in subjects with Parkinson's disease. J Neurol Neurosurg Psychiatry. 2006 Mar;77(3):322-6
- Jacobs, J, Dimitrova, D, Nutt, J, and **Horak, FB**. Can a stooped posture explain multidirectional postural instability in patients with Parkinson's Disease? Experimental Brain Research. 166:78-88, 2005
- Gurfinkel, V, Cacciatore, T, Cordo, P, **Horak, F**, Nutt, J, Skoss, R. Postural tone in the body axis of healthy humans, J Neurophysiol. 2006 Nov;96(5):2678-87
- Ivanenko, YP, Wright WG, Gurfinkel, VS, **Horak, F**, Cordo, P. Interaction of involuntary post-contraction activity with locomotor movements. Exp Brain Res. 2006 Feb;169(2):255-60.

- Dozza, M, Rocchi, L, Cappello, A, **Horak, FB**, Chiari, L. Influence of a portable audio-biofeedback device on structural properties of postural sway. J Neuroengineering Rehabil. 2005 May 31;2:13
- Chiari, L, Dozza, M, Cappello, A, **Horak, FB**, Macellari, V, Giansanti, D. Audio-biofeedback for balance improvement: an accelerometry-based system IEEE Trans Biomed Eng. 2005 Dec;52(12):2108-11.
- Dozza, M, Chiari, L, and **Horak, FB**. Audio-biofeedback improves balance in patients with bilateral vestibular loss. The Arch Physical Med Rehab. July, 2005.
- Macpherson, JM, **Horak, FB**. Chapter 39, Neural Control of Posture. In: .Kandel, Schwartz and Jessell. (eds.) Principles of Neural Science (In Press).
- Earhart, GM and **Horak, FB**. Balance Training, Chapter 41 in Textbook of Neural Repair and Rehabilitation, Ed. Patrice L. (Tamar) Weiss, Ph.D. (In Press).
- Creath, R, Kiemel, T, **Horak, FB**, Peterka, RJ, Jeka, JJ. A unified view of quiet and perturbed stance: Simultaneous co-existing excitable modes. Neurosci Letts 377:75-80, 2005.
- Dimitrova, D, **Horak, FB**, and Nutt JG. Directional-specific postural instability in subjects with Parkinson's disease. Exp Neurol. Jun;193(2):504-521, 2005.
- Kluzik, J, Peterka, R, and **Horak, F**. Differences in preferred reference frames for postural orientation shown by after-effects of stance on an inclined surface. Exp Brain Res May;162(4):474-89, 2005.
- Jeka, J, Kiemel, T, Creath, R, **Horak, F**, and Peterka, R. Controlling human upright posture: Velocity information is more accurate than position or acceleration. J. Neurophysiol. 92(4)2368-79, 2004.
- Dimitrova, D, **Horak, FB**, Nutt JG. Abnormal force patterns for multidirectional postural responses in patients with Parkinson's disease. Exp Brain Res 156(2): 183-95, 2004.
- Rocchi, L, Chiari, L, Cappello, A, Gross, A. and **Horak, FB**. Comparison between subthalamic nucleus and globus pallidus internus stimulation for postural performance in Parkinson's disease. Gait & Posture Apr;19(2):172-83, 2004.
- Dimitrova, D, **Horak, FB**, Nutt JG. Postural Muscle Responses to Multidirectional Translations in Patients with Parkinson's Disease. J. Neurophysiol Jan;91(1):489-501, 2004.
- Park, S, **Horak, FB**, Kuo, AD. Postural feedback responses scale with biomechanical constraints in human standing. Exp. Brain Res. 154:417-427, 2004.
- Buchanan, JJ, **Horak, FB**. Voluntary control of postural equilibrium patterns. Behav Brain Res. 143:121-140, 2003.
- Earhart, GM, **Horak, FB**. Gaining insight by going in circles. IEEE, 22(2):32-36, 2003.
- Dickstein, R, Peterka, RJ, **Horak, FB**. Effects of light fingertip touch on postural responses in subjects with diabetic neuropathy. J. Neurol. Neurosurg. Psych. 74:620-626, 2003.
- Patten, C, **Horak, FB**, Krebs, DE. Head and body center of gravity control strategies: adaptations following vestibular rehabilitation. Acta Oto-Laryngologica (Sweden). Jan;123(1):32-40, 2003.
- Earhart, GM, **Horak, FB**, Jones, GM, Block, E., Weber, KD, Suchowersky, O, Fletcher, WA. Is the cerebellum important for podokinetic adaptation? Ann NY Acad Sci 978:511-12, 2002.
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## SCHEDULE OF ACTIVITIES

### A Pilot Study of Balance and Vitamin D in Persons with Parkinson's Disease (PD)

	Recruitment	Study Visit	Follow Up
Eligibility Criteria	X	X	
Written Informed Consent		X	
Medical History		X	
Medications List		X	
Cognitive Battery Testing		X	
UPDRS Motor Score		X	
Dyskinesia Assessment (AIMS)		X	
Physical Activity Score (PASE)		X	
Dynamic Posturography Platform		X	
Long Force Plate Testing		X	
Falls Assessment		X	
Blood Draw- Vitamin D level		X	
Telephone Follow up			X

## **Career Development Plan**

### Candidate's Background:

Dr. Amie Peterson has been a Portland VA Parkinson's Disease, Research, Education and Clinical Centers (PADRECC) and Oregon Health & Science University (OHSU) fellow for approximately 18 months. During this time she has spent 50% of her time on research. She presented 2 posters at national meetings, with a two others accepted. Her various submissions involve descriptions of vitamin D levels and osteoporosis evaluations in persons with PD and dopamine antagonist prescription practices in persons with PD. She has also written and received IRB approval for the pilot study described in this application. She serves as the PI on this study and is actively enrolling patients. She is also a co investigator on an industry sponsored study at OHSU with a medication to improve dyskinesias in persons with PD. She is currently enrolled in the Human Investigations Program at Oregon Health & Science University. This is a 2-year course to improve research skills. She coauthored a review paper with Dr. Nutt on neurotrophic factors in PD for a peer reviewed publication. She has also been active in her career development and received a scholarship last year to attend the AAN's Leadership Development Program.

Prior to her fellowship here she spent a year in a clinical fellowship in movement disorders at UMass Medical Center. Her strong interest in research propelled her to pursue more fellowship time here at OHSU. In 2006 she served as the American Academy of Neurology's (AAN), American Neurologic Association's, and Child Neurology Society's health policy fellow. She worked in the office of Senator Jack Reed serving as a legislative aid. She continues to work in health policy serving on the AAN's legislative affairs committee and on the Parkinson's Resources of Oregon (PRO) advocacy board. During her residency she was primarily focused on clinical work. She was involved as a chief resident in teaching medical students and other residents and was awarded The Haffenreffer Award for excellence in research, teaching, and professionalism.

During medical school Dr. Peterson was awarded the John A. Hartford American Federation on Aging Research Scholarship at Harvard Medical School. The research portion took place at Beth Israel Deaconess Hospital where she worked on gait research with Dr. Jeff Hausdorff. One study focused on an exercise intervention in community dwelling elderly, another on the effects of antipsychotics on gait in an institutionalized population. She was a coauthor on a paper looking at altered gait rhythm in amyotrophic lateral sclerosis during this time as well. She received the Dean's fellowship award at the Medical College of Georgia, using it to do qualitative research on decision making in hospitalized older adults with and without cognitive impairment. This resulted in a poster at the American Geriatrics Society Annual meeting and a grand rounds presentation. She did some bench research as an undergraduate; working summers in industry in a toxicology lab and completing an undergraduate thesis with *in vitro* osteoblast cultures. She presented her thesis work as a poster at a national meeting on undergraduate research.

### Career Goals and Objectives

Dr. Peterson hopes to pursue a career in translational research; pursuing an academic career with both clinical and research roles. She is interested in the area of movement disorders and hopes to work to find ways to better care for persons with PD and other movement disorders. Gait and balance, an area with very few treatments and a major issue in late stage PD, is her current focus. She also hopes to continue her work in policy and use her research to inform better healthcare delivery. She has begun to work with the endocrine department to develop guidelines to ensure proper bone health management of persons with PD.

This award will give her the opportunity to carry out an independent project, improving skills in this particular research area, and in the general process of obtaining funding, conducting, and publishing research. Dr Peterson will hone her expertise in gait and balance assessment and treatment in Parkinson's disease, a relatively under-developed area in PD research, and an area in need of improved therapeutic approaches. This pilot study will allow Dr. Peterson to properly design an intervention study with vitamin D. Even if after the intervention study vitamin D does not turn out to be an effective intervention, Dr. Peterson will be positioned to pursue other gait and balance treatment strategies using state-of-the art technology for assessing balance. Dr. Peterson has truly unique resources here with state of the art equipment and a mentor who is one of the foremost experts in gait and balance.

Her specific goals for future planned research activities are highlighted in the table below. She plans to submit a manuscript on dopamine antagonists in PD in the very near future. She will continue data collection for her pilot study hoping to complete enrollment by the winter of 2010. She would use the end of the grant time to write up the pilot project submitting an abstract to the 2010 MDS meeting and a manuscript shortly thereafter. She will plan to start the intervention study, in 2010. She will also likely continue to take advantage of the data base systems available at the VA and possibly those available through collaborations between Kaiser and OHSU to continue some smaller health delivery projects to ensure at least 2 publications a year.

**Table 1: Prior and Planned Research Activities**

	2008(completed)	2009(anticipated)	2010(anticipated)
Publications	Neutrophic factors in PD	Prescription of dopamine antagonist to NW vets with PD	Pilot study data
Research	Pilot Study PD and Balance	Pilot Study PD and Balance	CDA – Balance and D in PD
Abstracts/ Posters	MDS - dopamine antagonists and PD PSG – Vitamin D and PD - MROS	AAN – dopamine antagonists NW Vets MDS- Vitamin D PD Portland vets	MDS- Present pilot data
Courses	Posturography Training Intro to Biostatistics Molecular Biology for Clinical Research Protection of Human Subjects	Applied Biostatistics Scientific Writing Evidence-based Medicine Seminar Ethics and epidemiology	Foundations in Public Health Ethics and Conduct of Research Applied BiostatisticsII Bioinformatics

Career Development/Training Activities During the Award Period:

If she receives this award, Dr. Peterson will be involved in a number of formal and informal training activities to ensure her successful transition to an independent clinical research physician. She will continue to participate in a weekly movement disorders journal club which includes a variety of clinical and basic science researchers. This allows a venue to present research plans, for in-depth education, and discussion on cutting edge issues within the field. The Portland VA/OHSU has one of the largest movement disorders group in the country. This relationship between basic and clinical researchers, complemented by many of the top authorities in the field, fosters the development of translational research projects. At least 50% her time will be spent in research. The other 50% will

include clinical work in movement disorders clinics, which will also serve the research activity by providing opportunities for recruiting study subjects.

She will also continue to participate in clinical and teaching conferences, both as a lecturer and attendant. These include weekly grand rounds and noon conferences, as well as more informal post clinic discussions. She plans to continue to give lectures to clinicians and patients through the PADRECC’s educational programs and visits to local support groups. These also serve as important resources for study recruitment. Work on research design and grant writing will continue through regular meetings with Dr.’s Nutt and Horak, and consultation with Dr. Orwoll as needed. She will also take part in grant writing seminars offered at the university level.

**Table 2: Weekly Schedule (shaded areas represent research time)**

	Monday	Tuesday	Wednesday	Thursday	Friday
Early morning		Movement	Grand Rounds Meet with Dr. Quinn	Movement Disorders Journal Club	
Mid-morning		Disorders Clinic			
Noon	Movement			Noon Conference	
Afternoon	Disorders Clinic				
Early evening	Synapse (monthly)		Classes		

Training in the Responsible Conduct of Research:

Dr. Peterson is fortunate to be at a university with a commitment to responsible research. OHSU has a designated Center for Ethics in Health Care. The bioethics study group offers monthly seminars in a variety of issues. Through the HIP class Dr. Peterson completed a course taught by OHSU’s chief integrity officer entitled Protection of Human Subjects. It was specifically focused on ensuring ethical research by reviewing historical and present day unethical research and reviewing the current regulations for conducting research. Part of the course included attendance at an IRB session to gain a better understanding of how research is evaluated. OHSU and the VA both require periodic computer based training modules on the ethical conduct of research. Over the last 18 months Dr. Peterson has completed at least 10 such modules, with topics including HIPPA, conflicts of interest, the protection of human subjects, and proper management of computerized data.

Through her work with the AMA and AAN Dr. Peterson has had a variety of exposures to ethical concerns in medicine and research, from attending formal courses offered during meetings to engaging in conversations with members of the ethics committee and other physicians as specific issues arise. The AAN generally offers an ethics seminar and Dr. Peterson hopes to attend the Ethics in Education session at this year’s annual meeting in April. Through her work towards a masters in clinical research Dr. Peterson hopes to enroll in a number of ethics based courses such as ethics and epidemiology, as well as courses on biostatistics and bioinformatics which will include education on the proper data management and data-sharing.



March 10, 2009

Grant Adjudication Committee  
Parkinson Study Group research/mentorship grants for new investigators

Re: Application of Dr. Amie Peterson

**OHSU Healthcare**

Movement Disorders Program  
Department of Neurology

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3181 S.W. Sam Jackson Rd.  
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tel 503 494-7231  
fax 503 494-9059  
www.ohsu.edu/pco

National Parkinson Foundation  
Center of Excellence

Director  
*John Nutt, M.D.*

Associate Director  
*Julie Carter, R.N., M.S., A.N.P.*

Clinical Care and Research  
*Matthew Brodsky, M.D.*  
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*Kathryn Chung, M.D.*  
*Duane Denny, M.D.*  
*Steven Gunzler, M.D.*  
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*John Nutt, M.D.*

Nurse Coordinator  
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Medical Social Worker  
*Vicki Wolff, L.C.S.W.*

Research  
*Fay Horak, Ph.D., PT.*  
*Steven Johnson, M.D., Ph.D.*  
*Jau-Shin Lou, M.D., Ph.D.*

Clinical Research Coordination  
*Pamela Andrews, B.S.*  
*Michele Barnard, B.S.*  
*Stephanie Crocker, B.A.*  
*Susan Loehner, R.N., B.S.N.*  
*Carolyn McCain*

Office Manager and Development  
*Diana Potts, B.S.*

Administrative Assistant  
*Amy Sterenberg, B.A.*

Patient Scheduling  
*Gloria Richards*

Dear Committee members,

I am writing in support of Dr. Peterson's application for the PSG's mentored clinical research award and to agree to provide mentorship to Dr. Peterson. As the fellowship director at OHSU I have had a great deal of contact with Dr. Peterson both in regard to the development of her research and well as in the clinical setting.

Dr. Peterson has developed several research projects since her arrival eighteen months ago. These include an exploration of the VA databases to determine the number of veterans in the Portland VA system with a diagnosis of Parkinson's disease that were also receiving contraindicated dopamine antagonists. She tracked the downward trend in the prescriptions of contraindicated dopamine antagonists to determine if the implementation of a pop-up warning about this contraindication in CPRS had an effect on the prescribing habits of Portland VA clinicians. She then examined the trends in dopamine antagonist prescribing practice in the Puget Sound VA system where there was also a PADRECC but no warning pop-up and in the Spokane VA system where there was neither a PADRECC nor a warning pop-up. She documented the downward trend for this inappropriate prescribing practice in all three VA systems but the Spokane system without a PADRECC lagged behind the Seattle and Portland VA systems. This project has been accepted as an abstract to the American Academy of Neurology for presentation at their annual meeting.

A second project deals with Vitamin D and its role in fall prevention and Parkinson's disease which she presents in this application. It should be noted that she has already presented some data on this topic at national meetings. One of the impressive features about this project is that it takes advantage of the amazing gait and balance resources available here at OHSU.

Other projects include a review that Dr. Peterson and I authored on neurotrophic factors in the treatment of Parkinson's disease for Neurotherapeutics. Dr. Peterson is also a regular presenter at our journal club that attracts basic and clinical researchers interested in the basal ganglia and dopamine. She finds provocative topics that always promote much discussion. Through the journal club she has had many interactions with basic as well as clinical researchers at the Portland VA and OHSU. In addition, the journal club has four to six outside speakers each year that has given her exposure to researchers outside our medical center.

My role in Dr. Peterson's further training will be to promote her interactions and collaborations with local and national researchers, encourage local and national presentations of her work and to find opportunities for her. As a clinical researcher, I can help her with development, trouble shooting, analysis, presentation, and publication of clinical projects. Dr. Peterson and I

n interact weekly in clinics, the basal ganglia journal club, and other Movement Disorder division or Neurology department activities. We will meet formally as needed for projects but at least once every two months. I collaborate extensively with Dr. Horak, one of her other mentors, and often Dr. Horak and I meet with Dr. Peterson together. I estimate that I will spend 5% of my effort, toward developing Dr. Peterson's career as a clinical researcher.

Dr. Peterson is hard working and clear thinking. She likes to present her ideas in journal club and at meetings. She likes to write. I think that with her rich array of mentors and the time to develop research skills and a research project that she has a very high chance of succeeding as a clinical researcher. I am currently involved in mentoring three Movement Disorder fellows and one post-doctoral student working with Dr. Horak. I also mentor three junior faculty in our division. Past trainees are listed in the table below:

<b>Trainee</b>	<b>Pre or Post</b>	<b>Degree at Entry</b>	<b>Institution</b>	<b>Training Period</b>	<b>Degree Completed</b>	<b>Trainee's Current Position</b>
Perla Thulin	Mov Dis Fellowship	MD	Brigham & Women's Hospital	1997-2000	N/A	Asst Prof Univ of Utah
Anthony May	Mov Dis Fellowship	MD	Georgetown Univ	2000-2001	N/A	Private Practice
Alok Sahay	Mov Dis Fellowship	MD	Univ of Rajasthan Jaipur, India	2001-2002	N/A	Asst Prof Univ of Cincinnati
Kathryn Chung	Mov Dis Fellowship	MD	Univ of Alberta, Edmonton, Alberta, Canada	2002-2004	N/A	Asst Prof Oregon Health & Science Univ
Jeff Kraakevik	Mov Dis Fellowship	MD	Univ of Iowa College of Medicine	2004-2006	N/A	Asst Prof Oregon Health & Science Univ
Steven Gunzler	Mov Dis Fellowship	MD	Univ of Rochester	2004-2006	N/A	Asst Prof Oregon Health & Science Univ
Jesse Jacobs	Pre-doc	BS	University of Colorado	2002-2007	Ph.D.	Asst Prof Case Western
Jason Aldred	Mov Dis	MD	Oregon Health & Science University	2007-2009	NA	NA
Amie Peterson	Mov Dis	MD	Brown University	2007-2009	NA	NA
Teresa Mangin	Mov Dis	MD	University of Pennsylvania	2008-2010	NA	NA

My time is currently distributed between 30% in research, 20% in patient care, 20% in teaching (including mentoring) and 30% administration.

Sincerely,



John G. Nutt, MD  
Professor of Neurology and  
Physiology & Pharmacology



March 10, 2009

Grant Adjudication Committee  
Parkinson Study Group research/mentorship grants for new investigators

**OHSU Healthcare**

Movement Disorders Program  
Department of Neurology

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*Carolyn McCain*

Office Manager and Development  
*Diana Potts, B.S.*

Administrative Assistant  
*Amy Sterenberg, B.A.*

Patient Scheduling  
*Gloria Richards*

Re: Application of Dr. Amie Peterson

Dear Committee members,

I would like to highly recommend Dr. Amie Peterson for the PSG's mentored clinical research award. I have known Dr. Peterson for two years and have been advising her with her current research and career plans. I have been very impressed by Dr. Peterson's clear and logical scientific thinking, critical review of the literature, enthusiasm for learning new techniques and cross-disciplinary medical areas, and devotion to clinical research. She is motivated to study both effects of novel interventions for Parkinson's disease and the impact of improved medical care on health care policy and implementation.

I plan on continuing to co-mentor Amie's research and research training by advising her on neural control of balance in Parkinson's disease, interpretation of computerized posturography, and clinical research design through this study and her future career development application. I will continue to meet with her weekly to discuss progress and problems with her research and to discuss important papers in the literature related to balance, mobility and falls in Parkinson's disease and the effects of Vitamin D. I will also monitor how she uses computerized posturography equipment and help her to interpret results from individual subjects and from her study. I will advise her on relevant courses she might take and opportunities for presentation of her work at scientific and clinical meetings.

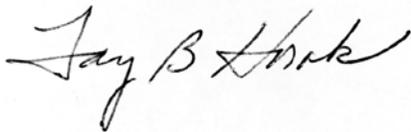
Dr. Peterson has frequent interactions with post-doctoral fellows in my laboratory who are also studying postural disorders in patients with Parkinson's disease. For example, Dr. Laurie King is a neuroscientist-physical therapist studying how exercise may improve mobility in Parkinson's disease. Dr. King has been instrumental in teaching Dr. Peterson how to use the computerized posturography system. Dr. Arash Salarian is a bioengineer who is designing software for new wearable, inertial sensors to quantify gait and mobility in the clinic, an exciting, new technique that Dr. Peterson may apply in her studies. Dr. Rajal Cohen is a cognitive psychologist focusing on freezing of gait in PD and Rebecca St. George is a bioengineering working on the effects of deep brain stimulation on posture and gait. All of my fellows working on Parkinson's disease meet together weekly with Dr. Peterson at Movement Disorders journal club for lively discussions of the research literature, research plans and preliminary results.

I am currently primary mentor for 5 post-doctoral fellows and secondary mentor for two neurology fellows, including Dr. Peterson, and a junior neurology faculty member. A table of my current and past trainees is attached. I am co-director of an NIH Neurological Sciences post-doctoral training grant and advisor to a

Rehabilitation Research training grant at the U of Washington. I currently have 2 NIH R0-1 grants and 2 private foundation grants to support the work of my laboratory. My effort is distributed to 75% research, 20% teaching/mentoring and 5% administration.

I will help Dr. Peterson achieve independence as a researcher by teaching her the skills of grant writing; collecting and interpreting posturography, falls and other clinical performance data; presenting her results in posters and lectures; helping with her statistical analysis and encouraging her to attend clinical research training opportunities at OHSU. I have no doubt that Dr. Peterson will become an independent researcher and a leader in the neurology of movement disorders. Given her background, skills, intelligence and motivation, Dr. Peterson is unique in combining her interests in determining the best interventions for her patients with applying that knowledge to improved health care policy to implement that knowledge.

Sincerely,

A handwritten signature in cursive script that reads "Fay B Horak". The signature is written in black ink on a white background.

Fay B. Horak, PhD, PT  
Research Professor  
Neurology



March 16, 2009

Re: Application for Parkinson Study Group research/mentorship grants for new investigators

The OHSU Department of Neurology is fully committed to providing Dr. Peterson the protected time and resources needed for the conduct of the proposed research.

Dr. Peterson is currently an Instructor in the Department of Neurology and will be appointed as an Assistant Professor effective August 1, 2009. This will be a fulltime appointment in the department and she will have all the rights and privileges of a faculty member. At the time of this appointment, Dr. Peterson will be offered a paid full-time position in the Department of Neurology. Currently, Dr. Peterson's has 50% protected time for research. Dr. Peterson has an office in the OHSU Parkinson's Center of Oregon and at the Portland VA. This office is fully equipped with a desktop computer, printer, phone line, high speed internet access and filing space. She also has secretarial support and assistance in grant preparation and award management through the Department of Neurology. She will have administrative support to assist in preparation of manuscripts and future grant submissions.

OHSU provides a rich environment for Dr. Peterson's career development. Her proposed pilot project at Oregon Health & Sciences University (OHSU) utilizes the rich resources and opportunities available for clinician scientists at OHSU. OHSU is Oregon's only academic health care center. OHSU is situated on a 116-acre campus with more than 30 buildings. In 2007, the campus expanded, adding more than 250,000 square feet in research space and 300,000 square feet in patient care space. The OHSU hospital complex is joined by a bridge to the Portland VA Medical Center, facilitating easy integration. In fiscal year 2008, OHSU had \$ 299,390,540 million in research grants, including \$192,975,880 million from the NIH.

OHSU is dedicated to training clinician scientists. The Oregon Clinical and Translation Research Institute (OCTRI) was one of the first NIH funded institutes conceived to serve as a transformative, novel and integrative home for clinical and translational science. OHSU and Kaiser Permanente's Center for Health Research (KPCHR) formed a partnership to create the institute. This partnership brings together a strong biomedical research university and an innovative practice-based research center associated with a large patient population. This institute builds on existing strengths at OHSU adding even more resources in order to remove barriers to the pace and growth of clinical and translational research. OCTRI includes the resources of what was

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**Dennis Bourdette, MD**  
*Chairman and Roy & Eulalia  
Swank Family Research  
Professor*  
[bourdett@ohsu.edu](mailto:bourdett@ohsu.edu)

known as the General Clinical Research Center. These resources have been expanded to form the Clinical and Translational Research Center (CTRC). Dr. Peterson is currently an OCTRI scholar and the access to the CTCRC resources, including biostatistics, core laboratory, nursing, and informatics support are helpful both for the current project and her future career development application.

Neuroscience research at OHSU is particularly strong. Neurosciences research accounts for about 30% of the total research grants at OHSU. The OHSU Brain Institute (OBI) was recently established to increase interdisciplinary research in neurosciences and its participants illustrates the breadth of neuroscience at OHSU. OBI is a joint effort of the OHSU School of Medicine's Departments of Anesthesiology and Perioperative Care, Behavioral Neuroscience, Biomedical Engineering, Neurological Surgery, Neurology and Psychiatry, the Vollum Institute, the Center for Research on Occupational and Environmental Toxicology, and the Oregon National Primate Research Center. The Department of Neurology is very active in neurological research and in fiscal year 2008 had \$15,832,407million in research grants and contracts, including \$11,647,722 million in NIH funding. The Department of Neurology has more than 50 faculty members with primary academic appointments with subspecialty clinical care and research programs in Parkinson's disease and other movement disorders, multiple sclerosis, aging and Alzheimer's disease, stroke, epilepsy, neuromuscular diseases, neuro-oncology and neurosciences critical care. All of these programs offer post-doctoral fellowship training. The Department of Neurology has a robust history of facilitating career development of clinician scientists. Presently there are seven K23 awardees in the department and two other junior faculty members have career development awards through the Department of Veterans Affairs.

The Parkinson Center of Oregon (PCO) arose out of the Movement Disorder Program established at OHSU in 1979. The PCO has eight faculty, three fellows and nine support staff. The support staff includes four clinical research coordinators, a nurse coordinator, and a social worker. Offices at the PCO are in close proximity to one another, and there are regular meetings and lectures. These include the weekly Journal Club, which alternates between the PCO and the Portland VA Medical Center. The journal club is a forum for discussing published papers and ongoing research projects. Presenters are either clinical or basic scientists in the Movement Disorders, from OHSU, the VA, and other institutions.

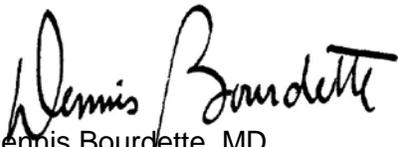
Portland VA Medical Center further enhances the resources for the candidate's career development. The Portland VA Medical Center is physically connected to OHSU. The Portland VA Medical Center is a modern 490 bed facility that serves Oregon and southern Washington and also serves as a referral center for Idaho, Alaska and Northern California. The PVAMC has approximately one hundred funded investigators and ranks in the top 10 VA medical centers nationwide in research support. The Portland VA Medical Center has an active research program in Parkinson's disease and is home to one of only six VA Parkinson's and Associated Diseases Research, Education and Clinical Centers PADRECC in the nation. This center includes an active Parkinson's disease clinic and Dr. Peterson will be able to recruit subjects from this clinic.

There are great opportunities for intellectual interactions, courses and seminars at OHSU and the Portland VA Medical Center for Dr. Peterson to interact with other investigators and attend conferences, seminars and journal clubs that will enhance her career. Clinical conferences include the Department of Neurology's Grand Rounds and Clinical Noon Conference. Research conferences include the Movement Disorders Journal Club and research conferences and seminars sponsored by the OHSU Brain Institute, Vollum Institute and other departments and institutes involved in neurosciences research. The Department of Neurology also hosts a

monthly meeting called the Synapse meeting, which is a forum for a wider exchange of ideas and cross-fertilization between scientists in the department that are studying various neurological diseases. An important area of career development is writing grants and scientific publications. Annually OHSU offers the "Writing Winning Grants" seminar given by Stephen W. Russell, D.V.M., Ph.D. This seminar is intended for clinician scientists and has the aim to improve their grant writing skills. In addition, the Research Funding and Development service offers the Vollum Institute writing program. This is an eight week seminar for investigators. The seminar is structured in a small group writing workshop format. In this seminar participants bring writing to class each week and the class discusses strategies and options for revising. Dr. Peterson will participate in both seminars.

Dr. Peterson has tremendous potential to become an outstanding clinician scientist. We anticipate that her pilot project will help her to be awarded a CDA and that she will go on to gain independent NIH funding. We will do everything possible to retain her as a permanent faculty member.

Sincerely,



Dennis Bourdette, MD  
Chairman and Roy and Eulalia Swank Family Research Professor

## **CHECKLIST**

### **Attachment 3**

#### **Type of Application:**

X NEW application

RESUBMISSION of application submitted (date previously submitted)\_\_\_\_\_

#### **Does your submission include the following?**

X Cover letter

X Face Page (Attachment 1)

X Narrative not extending 5 pages (not including references) and including: specific aims of the study, background, preliminary studies, research design and methods, plus references, and a protocol synopsis and schedule of activities, if applicable (Attachment 2);

X Budget

X Budget justification

X Biosketches for PI and co-PIs on project

#### **Please answer the following questions:**

1. Do you assure unrestricted access to the study database (if applicable)? N/A
2. Do you assure unrestricted right to publish all results? yes
3. Is a study steering committee in place, with appropriate expertise? N/A If not, is there an adequate plan for identifying a steering committee? (if applicable) N/A
4. Is there appropriate provision for study coordination? yes
5. Is there appropriate data management and biostatistical support? yes
6. Are there human subjects concerns in your proposal? yes
7. Does your proposal pose any conflict-of-interest or potential conflict-of-interest? no  
If so, please state:

THIS SHOULD BE YOUR LAST PAGE, NUMBERED