**S. Elizabeth Zauber, MD**

Associate Professor

Department of Neurology

Indiana University School of Medicine

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**EDUCATION:**

### 2003 MD Washington University St. Louis, MO

 School of Medicine

1999 BS Haverford College Haverford, PA

*Biology*

2007 - 2009 Fellowship in Movement Disorders Chicago, IL

*Rush University*

2003 - 2007 Internal Medicine Internship & St. Louis, MO

 Neurology Residency

*Washington University School of Medicine*

 *Barnes-Jewish Hospital*

**ACADEMIC APPOINTMENTS**:

### 2016- present Indiana University School of Medicine Indianapolis, IN

 Associate Professor, Department of Neurology

 Associate Residency Director 2015 - present

### 2009 - 2016 Indiana University School of Medicine Indianapolis, IN

 Assistant Professor, Department of Neurology

2008 - 2009 Rush University School of Medicine Chicago, IL

 Instructor, Department of Neurology

**CERTIFICATE/LICENSURE:**

2008 - Present Board certified by the American Board Psychiatry and Neurology

2009 - Present Licensed physician, State of Indiana (License # 01066977A)

**MEMBERSHIP IN PROFESSIONAL SOCIETIES:**

2013 - 2014 American Association of Neurological Surgeons, Non-surgeon member

2009 - Present Parkinson Disease Study Group, committee service

2009 - Present Huntington Disease Study Group, Site Investigator

2006 - Present The Movement Disorders Society

2003 - Present American Academy of Neurology

**AWARDS AND HONORS:**

Howard Hughes Summer Institute Research Scholarship Haverford College, 1997 + 1998

Sigma Xi student research prize, Thomas Jefferson University College of Graduate Studies, 1999

**TEACHING:**

***Resident lectures***

Neurology resident lecture series on movement disorders

(6 one hour lectures - repeats yearly) 2009 - 2015

Pediatric Neurology “textbook club” mentor for movement disorders chapters.

(10 contact hours, Fall, 2011)

Psychiatry

“Psychiatric aspects of movement disorders” (annually) 2010-2012

Physical Medicine Rehabilitation

“Cervical Dystonia: diagnosis and treatment,” 2012

“Parkinson disease and movement disorders,” (annually) 2009- 2012

***Clinical supervision of residents***

4-6 Neurology residents per year spend one month in movement disorders clinic, 2009-2015

 1 psychiatry resident spent a half day a week in movement disorders clinic, 2014-2015

 Inpatient clinical service 2-4 weeks per year, 2009-2015

***Medical Student didactics***

Introduction to the Neurological Exam lecture and demonstration, October, 2010; 2013, 2014

***Fellows***

 **Clinical supervision**

Annie Baird, MD movement disorders fellowship at Indiana University, 2010-2011

 Paul Flamme, MD movement disorders fellowship at Indiana University, 2014-2015

 Chris James, MD movement disorders fellowship at Indiana University, 2015-2016

 **Didactics**

One hour lecture to neurophysiology fellows:

 “The electrophysiology of Deep Brain Stimulation,” 2013-2015

***Physician lectures***

*Indiana University Neurology Grand Rounds*

1. “Deep Brain stimulation for Parkinson disease and Essential Tremor: patient selection and clinical outcomes.” September 3, 2014
2. “Deep Brain stimulation for movement disorders: current uses and future directions” May, 17, 2012
3. Non-Motor and Pre-Motor Parkinson’s disease” March 3, 2011
4. “Deep Brain Stimulation for Dystonia” October 1, 2009

*Other Departments*

1. Indiana Univ. Geriatrics Conference: “Parkinson disease and Falls in the Elderly” February 24, 2010.
2. Neurosurgery conference: “Approach to the patient with a movement disorder” February 10, 2010.

*Other Continuing Medical Education Lectures:*

 Neurology Update for Neurologists course

1. “Treatment of Parkinson’s disease” Neurology Update for Neurologists, March 5, 2011.
2. “Evaluation and Treatment of Dystonia” Neurology Update for Neurologists, December 7, 2013.
3. Course Director and lecturer: Indiana University Health Movement disorders symposium, May 18, 2013 “Early Parkinson disease,” “Deep Brain Stimulation for Parkinson disease.”
4. Indiana Neurological Society Fall Meeting, 2014, “Update on Diagnosis and Treatment of Parkinson’s disease.”

***Invited Lectures (National and regional)***

1. “Parkinson's disease: A Multidisciplinary Approach to Assessment, Treatment, & Research” Invited Session at: the American Speech Language and Hearing Association Annual Meeting, November 15, 2012.
2. “Improving Treatments for Parkinson’s disease: Perspectives from Interdisciplinary Collaborations,” Chronic Diseases Research Interest Group, Purdue University, College of Health and Human Sciences, West Lafayette, IN, February 3, 2012.
3. “Updates on Essential Tremor” Bluegrass regional movement disorders symposium. Louisville, KY. October 22, 2016.

***Mentoring***

**Post-doctoral**

Courtney Johnson, PhD, Neuropsychology fellow, Dept. Psychiatry, Indiana University Sch. Med. 2014-2015

**Graduate Students**

Master’s degree thesis committee, Tammy Sheehy, Dept. Kinesiology, Purdue University, 2013-2014.

PhD. Thesis committee, Danelle Rolle, Dept. Occupation and Environmental Health, Purdue University, 2014-present.

PhD. Thesis committee, Eric Ward, Dept. Occupation and Environmental Health, Purdue University, 2014-present.

**Undergraduate Student**

Atticus Coscia, University Notre Dame, 2014-2016.

**SERVICE:**

***Clinical Service:***

Indiana University Hospital Neurology inpatient and consults

3 weeks a year 2009 - 2012

Wishard (county) Hospital - Neurology inpatient and consults

2 weeks a year 2009 - 2012

Indiana University Health Methodist Hospital, Neurology consults

2 weeks a year 2012 - Present

Movement disorders clinic

3 days/week 2009 - Present

Intraoperative microelectrode recording

1 day a week 2009 - 2015

***Committee Service:***

**Department**

Neuroscience center Education committee (member), 2012 - 2013

*Helped to plan monthly CME events for the Neuroscience center*

Neurosurgery Dept. Faculty search Committee (member) 2012 - 2013

Data Safety Monitoring Board – Indiana Alzheimer’s disease Center 2013 - Present

Neurology Dept. Education Committee 2013 - 2014

Neurology Dept. Call and Coverage Committee 2014

*Helped to revise night call duties for the dept.*

Neurology Dept. Residency Recruitment Committee 2014 - 2015

Neurology Dept. Research Administration Committee 2014 - 2015

*Designed and lead this committee*

Neurology Dept. Faculty search Committee 2014 - 2015

*Led a search for new movement disorders neurologist*

**School of Medicine**

 Faculty Development Coordination Committee (member) 2012 - Present

 *Attend monthly meetings; serve as liaison between faculty and Office of Faculty affairs and Professional Development.*

 *Served on a sub-committee which selected a mentoring award.*

**National organizations**

Parkinson Study Group nominating committee 2011

***Journal Reviews:***

Parkinsonism and Related Disorders 2009 - Present

Brain Imaging and Behavior 2013

The Journal of Clinical Endocrinology & Metabolism 2012

International Journal of Neuroscience 2011

Movement Disorder 2009

### *Community Service:*

Board of Directors: Rock Steady Boxing: a community exercise program for people with Parkinson disease, 2010-2016.

*Invited Community Lectures:*

1. “Huntington’s disease 101,” Huntington’s disease Society of America Indiana Chapter, Annual State Conference, Indianapolis, November 6, 2010, and October 10, 2009.
2. Deep Brain Stimulation for Parkinson disease,” Indiana Univ. Sch. Med. Parkinson’s disease symposium, July 14, 2012.
3. “Parkinson’s disease research at Indiana University” presented to Rock Steady Boxing, Indianapolis, IN, April 20, 2012.
4. “Questions and Answers about Parkinson’s disease” presented to Greater Lafayette, Parkinson Support Group, West Lafayette, IN, March 3, 2012.
5. “Introduction to Parkinson disease,” presented quarterly for “train the trainer” educational events at Rock Steady Boxing, an Indianapolis Parkinson disease exercise support group. 2012-2014
6. “Update on new treatments and research for Parkinson disease,” Parkinson Awareness Association of Central Indiana Spring Event. April, 2014.
7. “Advanced treatments for Movement disorders,” Indiana University Health half day symposium, July, 12, 2014.

**GRANT SUPPORT (Active):**

**GRANT SUPPORT (Completed):**

1. Role: PI

Indiana University Health Values Fund (VFR366)

Impact of medical and surgical therapies on communication in PD

$100,000 5/1/12 – 8/1/14

1. Role: Co-Investigator

Indiana University Collaborative Research Grants (IUCRG)

*Relating electrophysiology and symptoms of Parkinson's disease*

$74,823 3/15/13 – 3/15-14

1. Role: Co-Investigator

 PI: Ulrike Dydak

 National Institutes of Health (R01ES020529-01)

 Neuroimaging for Early Diagnosis of Manganese Toxicity in Humans and Rodents

 $70,803 7/1/11-6/30/16

**CLINICAL TRIALS (Active)**

2015 - 2016 Site PI: Osmotica, Ally LID I/II, A Multicenter, Randomized, Placebo-controlled, Double-blind, 16 Week Study to Evaluate the Efficacy and Safety of Amantadine HCl Extended Release Tablets in Parkinson’s Disease Subjects with Levodopa-Induced Dyskinesias

2014 - Present Site Sub-I: First-HD Randomized controlled trial of SD-809 for Huntington’s chorea

2013 - Present Sub I: Medtronic, Product Surveillance Registry – Deep Brain Stimulation

2013 - Present Motor Rater: HD Qol – Study investigating quality of life rating scales for Huntington disease

**CLINICAL TRIALS (Completed)**

2010 - 2013 Site PI: NIH/N NIH/NCCAM, Phase III clinical trial to assess the effects of Creatine Monohydrate (HD-02) on the progression of functional decline in Huntington’s disease as measured by the change in the Total Functional Capacity scale over 36 months.Creatine Safety, Tolerability, and Efficacy in Huntington’s Disease: CREST-E

2011 Sub-investigator: Schering Plough protocol extension study PO6153; A Phase 3, 40 week, Active Controlled, Double-Blind, Double Dummy Extension Study of Preladenant in Subjects with Moderate to Sever Parkinson’s Disease (Phase 3, Protocol No PO6153).

2010 - 2011 Sub-investigator: COHORT. A prospective observational study of patients who are gene positive for Huntington’s Disease.

2010 Sub-investigator: Novartis Study 1003-14  A 6-week, double-blind, placebo-controlled, randomized, multicenter study to explore the efficacy and safety of AFQ056 when combined with increased doses of L-dopa in Parkinson’s Disease patients with OFF time and moderate-severe L-dopa induced dyskinesia.

2010 Sub-investigator: Teva Study 0911-07  A Double-blind, Placebo Controlled, Randomized, Multicenter Study to Assess the Safety and Clinical Benefit of Rasagiline as an Add on Therapy to Stable Dose of Dopamine Agonists in the Treatment of Early Parkinson’s Disease

2010 Sub-investigator: Schering Plough Merck A Phase 3, 12-Week, Double-Blind, Placebo- and Active-Controlled Efficacy and Safety Study of Preladenant in Subjects with Moderate to Severe Parkinson’s Disease. (Phase 3; Protocol No. P04938)

2009 Sub-investigator: Impax Labratories: A Study to compare Pharmacokinetics and Pharmacodynamics of IPX066 to Standard Cabidopa-levodopa

2009 - 2013 Motor rater: PREDICT-HD Predictors of Huntington’s Disease

2008 Sub-investigator: Merk: A Randomized Double-Blind 2-Period Crossover Study to Evaluate Effectiveness of Single-Dose MK-0657 in Combination with Levodopa on Motor Symptoms and Dyskinesias in Patients with PD

**PUBLICATIONS:**

***Peer Reviewed Publications:***

1. Zauber, S.E., Ahn, S. Worth, R.M., Rubchinsky, L. Oscillatory neural activity of anteromedial Globus Pallidus internus in Tourette syndrome. Clinical Neurophysiology, 2014 125(9):1923-4.
2. Ahn, S., Zauber, S.E., Worth, R.M., Rubchinsky, The response of the subthalamo-pallidal networks of the Basal Ganglia to oscillatory cortical input in Parkinson’s disease. BMC Neuroscience 2014, 15(Suppl 1):P57.
3. Lee JM, Huntington Study Group COHORT Investigators. CAG repeat expansion in Huntington disease determines age at onset in a fully dominant fashion. Neurology. 2012 78(10):690-5.
4. Salloway S, Sperling R, Fox NC, Blennow K, Klunk W, Raskind M, Sabbagh M, Honig LS, Porsteinsson AP, Ferris S, Reichert M, Ketter N, Nejadnik B, Guenzler V, Miloslavsky M, Wang D, Lu Y, Lull J, Tudor IC, Liu E, Grundman M, Yuen E, Black R, Brashear HR; Bapineuzumab 301 and 302 Clinical Trial Investigators. Two phase 3 trials of bapineuzumab in mild-to-moderate Alzheimer's disease.
5. Dorsey ER, Beck CA, Darwin K, Nichols P, Brocht AF, Biglan KM, Shoulson I; Huntington Study Group COHORT Investigators. Natural history of Huntington disease. JAMA Neurol. 2013 Dec;70(12):1520-30.
6. Huntington Study Group COHORT Investigators, Dorsey E. Characterization of a large group of individuals with huntington disease and their relatives enrolled in the COHORT study. PLoS One. 2012;7(2):e29522.
7. Zauber, S.E., Watson, N., Comella, C., Bakay, R.A.E., Metman, L.V., Stimulation-induced parkinsonism after GPi DBS for cranio-cervical dystonia. J. Neurosurgery, 2009; 110: 229-33.
8. \*5. Dorsey ER, Beck CA, Darwin K, Nichols P, Brocht AF, Biglan KM, Shoulson I; Huntington Study Group COHORT Investigators. Natural history of Huntington disease. JAMA Neurol. 2013 Dec;70(12):1520-30.

1. \*6. **Zauber, S.E**., Ahn, S. Worth, R.M., Rubchinsky, L. Oscillatory neural activity of anteromedial Globus Pallidus internus in Tourette syndrome. Clinical Neurophysiology, 2014 125(9):1923-4.
2. \*7. Ahn, S., **Zauber, S.E**., Worth, R.M., Rubchinsky, L. The response of the subthalamo-pallidal networks of the Basal Ganglia to oscillatory cortical input in Parkinson’s disease. BMC Neuroscience 2014, 15(Suppl 1):P57.
3. \*8. Ahn, S., **Zauber, S.E**., Worth, R.M., Witt, T. Rubchinsky, L. Interaction of synchronized dynamics in cortex and basal ganglia in Parkinson’s disease. EJN 2015, 42: 2164–2171.
4. \*9. Dharmadhikari, S., Ma, R., Yeh, C., Stock, A., Snyder, S., **Zauber, S.E**., Beste, C., Dydak, U. Striatal and thalamic GABA level concentrations play differential roles for the modulation of response selection processes by proprioceptive information. Neuroimage 120 (2015) 46-42.
5. 10. Ratnadurai-Giridhara, S, Zauber, S.E., Worth, R.M., Witt, T., Ahn, S., Rubchinsky, L.L. Temporal patterning of neural synchrony in the basal ganglia in Parkinson’s disease. Clinical Neurophysiology. 127 (2016) 1734-1756
6. Deeb W, et al., The International Deep Brain Stimulation Registry and Database for Gilles de la Tourette Syndrome: How Does It Work? Front Neurosci. 2016 Apr 25;10:170. doi: 10.3389/fnins.2016.00170.
7. Ahn, S., Zauber, S.E., Worth, R.W., Rubchinsky, L.L. Synchronized Beta-Band Oscillations in the Globus Pallidus – Subthalamic Nucleus Network Under Periodic External Input. Frontiers in Computational Neuroscience (Accepted)

***Book Chapters:***

1. Zauber, S.E., and Goetz, C.G., “Neuroleptic-Induced Movement Disorders” in *Therapeutics of Parkinson’s Disease and Other Movement Disorders*, eds. Hallett, M., and Powe, W. 2008, John Wiley & Sons, Ltd.
2. Barton, B., Zauber, S.E., Goetz, C.G. “Movement Disorders Caused by Medical Diseases” *Seminars in Neurology,* 2009; 29(2):97-110.
3. Zauber S.E., and Kompoliti, K. “Metabolic Causes of Chorea.” In *Chorea,* 2010, ed. Walker, R. Oxford University Press.
4. Zauber, S.E. and Verhagen, L.M. “Fundamentals of Deep Brain Stimulation Programming.” In *Deep Brain Stimulation Management*, ed. Marks, W.J. 2010, Cambridge Press.
5. Zauber, S.E., and Goetz, C.G. “Dyskinesia in Parkinonism.” In *Hyperkinetic Movement Disorders*, ed. Jankovic, J; [Albanese](http://www.amazon.com/s/ref%3Dntt_athr_dp_sr_2?_encoding=UTF8&field-author=Alberto%20Albanese&search-alias=digital-text),A, 2012, Wiley-Blackwell.
6. Dydak, U., Edmondson, D.A., Zauber, S. E., *“*Magnetic Resonance Spectroscopy in Parkinsonian Disorders.” in *Magnetic Resonance Spectroscopy of Degenerative Brain Diseases,*ed. Oz, G. Springer, 2016.
7. Zauber, S.E. “Psychogenic Movement Disorders” in *Non-Parkinsonian movement disorders*, eds. Hall, D., Barton, B. Wiley-Blackwell’s Neurology in Practice. (In Press)

***Peer reviewed Abstracts:***

1. Agrawal N., Verhagen Metman L, Comella C, Zauber E, Bakay RAE. Lateralization of Parkinson’s disease and agenesis of the corpus collosum. Mov Disord 2008; 23(S1):S131.
2. Zauber, S.E., Campbell, M.C., DeAlwis, D., Weaver, P. Tabbal, S., Perlmutter, J.S., and Hershey, T. Vim DBS improves Working Memory performance in patients with Essential Tremor.  American Academy Neurology 2008 Annual Meeting.
3. Zauber, S.E., Metman, L.V., Stebbins, G., Goetz, C. The Impact of Dyskinesia on a Quantitative Measure of Fine Motor Function. American Academy Neurology 2009 Annual Meeting.
4. Zauber, S.E., Ahn, S., Worth, R.M., Rubchinsky, L. Electrophysiology of anterior medial GPi in Tourette syndrome: a case study. The International Movement Disorders Society Meeting, Dublin, June, 2012. [*Selected for guided poster tour*]
5. Zauber, S.E., Ahn, S., Worth, R.M., Witt, T. Rubchinsky, L. Patterns of Cortical-Basal Ganglia synchrony in Parkinson disease. The International Movement Disorders Society Meeting, Sydney, June, 2013.
6. Zauber, S., Huber, J. The Effects of Disease Presentation & Dopaminergic Drugs on Speech in Parkinson's Disease. American Speech Language Association meeting, November 16, 2013, and World Parkinson disease Congress October 2, 2013.
7. L.L. Rubchinsky, S. Ahn, S.E. Zauber, R.M. Worth (2013) Dynamical Circuits Coupling Between Basal Ganglia and Cerebral Cortex. Abstracts of Society for Industrial and Applied Mathematics conference on applications of dynamical systems, p. 139.
8. S. Dharmadhikari, R. Ma, Z. Long, C. Yeh, S. Snyder, E. Zauber, R. Garcia, M. Moriyasu, R. M. Bowler, J. B. Murdoch, U. Dydak. Manganese Neurotoxicity: In Vivo GABA Levels Correlate with Motor Deficits in US Welders. Society of Toxicology, March, 2014.
9. Z. Long, C. Yeh, X. Li, S. Snyder, E. Zauber, Y. Jiang, U. Dydak. Vulnerability of Frontal Cortex to Chronic Manganese Exposure in Welders. Society of Toxicology, March, 2014.
10. R. Ma, C. Yeh, E. J. Ward, Z. Long, J. B. Murdoch, S. Snyder, E. Zauber, F. Rosenthal, U. Dydak. GABA Levels Correlate with Exposure Levels and Brain Deposition of Manganese in US Welders. Society of Toxicology, March, 2014.
11. Ma, R. Stock, A., Zauber, S.E, Murdoch, J.B., Dharmadhikari, S., Long, Z., Beste, C., Dydak, U. Manganese Induced Changes In Thalamic GABA Levels Influence Cognitive and Motor Performance. The International Society for Magnetic Resonance in Medicine, May, 2014.
12. Adams, S., Bowler, R.M., Garcia, R., Moriyasu, M., Kornblith, E.S., Gocheva, V., Ma, R., Dharmadhikari, S., Yeh, C., Zauber, S.E., Snyder, S., Long, Z., Dydak, U. A comparative study of the cognitive effects of manganese exposure among active welders and unexposed controls. Association for psychological Science, May, 2014.
13. Dydak, U., Ward, E.J., Ma, R., Snyder, S., Zauber, S. E., Murdoch, J., Long, Z., Rosenthal, F. Occupational Manganese Exposure Levels Correlate with Brain GABA Levels. The International Society for Magnetic Resonance in Medicine, May, 2014.
14. Sheedy, T., Zauber, S.E., McDonough, M., Social support, physical challenge, and psychological growth in a group physical activity program for people with Parkinson’s disease. The North American Society for the psychology of sport and physical activity. June, 2014.
15. Rosenthal, F.R., Ward, E., Zauber, S.E., Dharmadhikari, S., Snyder, S., Ma, R., Long, Z., Yeh, C., Bowler, R., Dydak, U. Deficits in Neurological and Neuropsychological Function vs. Cumulative Exposure to Manganese in Production Welders. International Society for Environmental Epidemiology, August, 2014.
16. Dharmadhikari, S., Zauber, S, Dydak, U. Increased thalamic GABA levels correlate with PD severity. 12th International Conference on Alzheimer's & Parkinson's Diseases. Nice, France, March, 2015.