

B. Jill Venton, Ph.D.

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Positions and Employment

Assistant Professor, University of Virginia, Charlottesville, VA July 2005-present
Department of Chemistry and Neuroscience Graduate Program

Research interests:

- Development of new carbon nanotube-based biosensors
- Electrochemical sensors for understanding adenosine signaling
- Measurements of neurotransmitters in *Drosophila*
- Rapid capillary electrophoresis for monitoring neurotransmitter changes during drug abuse

Postdoctoral Researcher, University of Michigan, Ann Arbor, MI 2003-2005
Advisors: Robert Kennedy (Chemistry) and Terry Robinson (Psychology)
Research: Rapid detection of amino acids changes during fear behavior using capillary electrophoresis

Education

Ph.D., Chemistry (Analytical), University of North Carolina, Chapel Hill, NC 2003
Advisor: Mark Wightman
Dissertation: Electrochemical detection of chemical dynamics in the rat brain

B.S., Chemistry, University of Delaware, Newark, DE 1998
Honors degree, *summa cum laude*
Research Advisor: Murray Johnston
Undergraduate thesis: Secondary structure of oligonucleotides probed by MALDI

Awards and Fellowships

Society for Electroanalytical Chemistry (SEAC) Young Investigator Award 2011
Camille Dreyfus Teacher-Scholar 2010
American Chemical Society PROGRESS/Dreyfus Foundation Lectureship 2008
Eli Lilly Young Analytical Investigator Award 2007
Meade Endowment Honored Faculty 2007-2008
National Science Foundation CAREER award 2007-2012
NIH Postdoctoral Fellowship 2003-2005

- NIDA Institutional Training Grant

Charles N. Reilley Award 2002

- Presented by Pharmacia to the most outstanding analytical graduate student

National Science Foundation Graduate Research Fellowship 1998-2001

Grants and Funding

Camille Dreyfus Teacher-Scholar, Dreyfus Foundation, 5/2010-4/2015, \$75,000

“Tiny sensors for tiny organisms: measuring neurotransmitter dynamics in the fruit fly brain”

National Institutes of Health, National Institute of Mental Health, 7/2009-5/2014, \$1,818,346

1R01MH085159: “Real-time measurements of neurotransmission in *Drosophila melanogaster*”

Eli Lilly Young Investigator Award, 10/2007-10/2010, \$100,000

National Science Foundation, 2/2007-1/2012, \$550,000

“CAREER: Carbon nanotube modified microelectrodes for insect neurotransmitter detection”

Completed Funding

National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering, 8/2007-7/2009, \$397,313

R21: “An electrochemical adenosine sensor for *in vivo* applications”

American Heart Association, 7/2007-6/2009, \$132,000

“Mechanisms of adenosine formation during ischemia”

Distinguished Young Investigator Award, Fund for Excellence in Science and Technology, University of Virginia, 7/2006-6/2007, \$50,000 (extended to 2008)

“Monitoring fast neurochemical changes using capillary electrophoresis with electrochemical detection”

Jeffress Memorial Trust, 1/2006–12/2006, \$25,000

“Development of an electrochemical adenosine sensor”

Refereed Publications

From work done at Virginia:

14.) C.B. Jacobs, M.J. Peairs, and **B.J. Venton**. Carbon nanotube based electrochemical sensors for biomolecules. *Analytica Chimica Acta*. **2010**, 662, 105-127.

13.) X. Borue, B. Condrón, **B.J. Venton**. Both synthesis and reuptake are critical for replenishing the releasable serotonin pool in *Drosophila*. *Journal of Neurochemistry*. **2010**, 113, 188-199.

12.) Y. Xu and **B.J. Venton**. Microelectrode Sensing of Adenosine/Adenosine-5'-triphosphate with Fast-Scan Cyclic Voltammetry. *Electroanalysis*. in press.

11.) T. L. Vickrey, B. Condrón, **B.J. Venton**. Detection of endogenous dopamine changes in *Drosophila* using fast-scan cyclic voltammetry. *Analytical Chemistry*. **2009**, 81, 9306–9313.

10.) G. Shambat, A. Deberardinis, P. Reinke, **B.J. Venton**, L. Pu, J. Bean, B. Chen, J. Tour. Addition Reaction and Characterization of Chlorotris(triphenylphosphine)iridium(I) on Silicon(111) Surfaces. *Applied Surface Science*. **2009**, 255, 8533-8538.

- 9.) S.E. Cooper and **B.J. Venton**. Fast-scan cyclic voltammetry for the detection of tyramine and octopamine. *Analytical Bioanalytical Chemistry* **2009**, 394, 329-336.
- 8.) X. Borue, S.E. Cooper, J. Hirsh, B. Condon, **B.J. Venton**. Quantitative evaluation of serotonin release and reuptake in Drosophila. *Journal Neuroscience Methods*. **2009**, 179, 300-308. NIHMSID # 112632
- 7.) M.L. Huffman and **B.J. Venton**. Carbon fiber microelectrodes for in vivo applications. *Analyst*, **2009**, 134, 18-24. NIHMS#110526 Pubmed i.d.# 19082168
- 6.) M.L. Huffman and **B.J. Venton**. Electrochemical properties of different carbon-fiber microelectrodes using fast-scan cyclic voltammetry. *Electroanalysis*. **2008**, 20, 2422-2428.
- 5.) C. B. Jacobs, T.L. Vickrey, and **B.J. Venton**. Measuring chemical events in neurotransmission. Wiley Encyclopedia of Chemical Biology, **2009**, 3, 319-330.
- 4.) A.M. Strand and **B.J. Venton**. Flame etching enhances the sensitivity of carbon-fiber microelectrodes. *Analytical Chemistry*, **2008**, 80, 3708-3715.
- 3.) S. Cechova and **B.J. Venton**. Transient adenosine efflux in the rat caudate-putamen. *Journal of Neurochemistry*, **2008**, 105, 1253-1263.
- 2.) B.E. Kumara Swamy and **B.J. Venton**. Carbon nanotube-modified microelectrodes for simultaneous detection of dopamine and serotonin *in vivo*. *Analyst*, **2007**, 132, 876-894.
* This article was highlighted in *Chemical Technology*, **2007**, 4, T66.
- 1.) B.E. Kumara Swamy and **B.J. Venton**. Subsecond detection of physiological adenosine concentrations using fast-scan cyclic voltammetry. *Analytical Chemistry*, **2007**, 79, 744-750.

Work Previous to Virginia: (Note: published under both Venton and Trafton.)

- 15.) **B.J. Venton** and R.M. Wightman. Pharmacologically induced, subsecond dopamine transients in the caudate-putamen of the anesthetized rat. *Synapse*, **2007**, 61, 37-39.
- 14.) **B.J. Venton**, R.T. Kennedy, T.E. Robinson, S. Maren. Dynamic increases in glutamate and GABA in the basolateral amygdala during acquisition and expression of conditioned fear. *European Journal of Neuroscience*, **2006**, 12, 3391-3398.
- 13.) **B.J. Venton**, P.E.M. Phillips, W.C. Wetsel, D. Gitler, G. Augustine, P. Greengard, R.M. Wightman. Cocaine increases dopamine release by mobilization of a synapsin-dependent reserve pool. *Journal of Neuroscience*, **2006**, 26, 3206-3209.
- 12.) D. Gitler, J. Feng, Y. Takagishi, V.M. Pogorelov, R.M. Rodriguiz; **B.J. Venton**, P.E.M. Phillips, Y. Ren, H.-T. Kao, R.M. Wightman, P. Greengard, P. W.C. Wetsel, G.J. Augustine. Synaptic vesicle trafficking and drug addiction in synapsin triple knockout mice. *Cell Biology of Addiction*, **2006**, 341-359.
- 11.) C.J. Watson, **B.J. Venton**, R.T. Kennedy. *In vivo* measurements of neurotransmitters by microdialysis sampling. *Analytical Chemistry*, **2006**, 78, 1391-1399.

- 10.) **B.J. Venton**, T.E. Robinson, R.T. Kennedy. Transient changes in nucleus accumbens amino acid concentrations correlate with individual responsivity to the predator fox odor 2,5-dihydro-2,4,5-trimethylthiazoline. *Journal of Neurochemistry* **2006**, 96, 236-246.
- 9.) **B.J. Venton**, H. Zhang, P.A. Garris, D. Sulzer, P.E.M. Phillips, R.M. Wightman. Real-time decoding of dopamine neurotransmission in the caudate-putamen during tonic and phasic firing. *Journal of Neurochemistry*, **2003**, 87, 1284-1295.
- 8.) **B.J. Venton** and R.M. Wightman. Psychoanalytical electrochemistry: dopamine and behavior. *Analytical Chemistry*, **2003**, 75, 414A-421A.
- 7.) D.L. Robinson, **B.J. Venton**, M.L. Heien, R.M. Wightman. Detecting subsecond dopamine release with fast-scan cyclic voltammetry in vivo. *Clinical Chemistry*, **2003**, 49, 1763-1773.
- 6.) P.A. Garris, E.A. Budygin, P.E.M. Phillips, **B.J. Venton**, D.L. Robinson, B.P. Bergstrom, G.V. Rebec, R.M. Wightman. A role for presynaptic mechanisms in the actions of nomifensine and haloperidol. *Neuroscience*, **2003**, 118, 819-829.
- 5.) **B.J. Venton**, D.J. Michael, R.M. Wightman. Correlation of local changes in extracellular oxygen and pH that accompany dopaminergic terminal activity in the rat caudate-putamen. *Journal of Neurochemistry*, **2003**, 84, 373-381.
- 4.) K.P. Troyer, M.L. Heien, **B.J. Venton**, R.M. Wightman. Neurochemistry and electroanalytical probes. *Current Opinion in Chemical Biology*, **2002**, 6, 696-703.
- 3.) **B.J. Venton**, K.P. Troyer, R.M. Wightman. Response times of carbon fiber microelectrodes to dynamic changes in catecholamine concentration. *Analytical Chemistry*, **2002**, 74, 539-546.
- 2.) D.L. Robinson, P.E.M. Phillips, E.A. Boudygin, **B.J. Trafton**, P.A. Garris, R.M. Wightman. Sub-second changes in accumbal dopamine during sexual behavior in male rats. *NeuroReport*, **2001**, 12, 2549-2552.
- 1.) B.D. Bath, D.J. Michael, **B.J. Trafton**, J.D. Joseph, P.L. Runnels, R.M. Wightman. Subsecond adsorption of dopamine at carbon-fiber microelectrodes. *Analytical Chemistry*, **2000**, 72, 5994-6002.

Book Chapters

M.G. Roper, C. Guillo, and **B.J. Venton**. High speed electrophoretic separations. In "Handbook of Capillary and Microchip Electrophoresis and Associated Microtechniques" CRC Press: New York. J.P. Landers, editor, **2008**.

Dissertations Directed

Xenia Borue, PhD. Mechanisms of Serotonergic Signaling in Drosophila. 5/2009
Current position: Med school, completing MD portion of MD/PhD

Invited Lectures (from work at Virginia)

Dartmouth College Medical School (Physiology Dept.), March 23, 2010

Dunaway/Burnham Visiting Scientist

“Electrochemical sensors for measuring dopamine and serotonin in *Drosophila*”

University of Pittsburgh, Pittsburgh, PA, Jan. 28, 2010

“Electrochemical sensors for measuring neurotransmitter changes in *Drosophila*”

Gordon Research Conference on Electrochemistry, Ventura, CA, Jan. 12, 2010

“Carbon-nanotube based electrodes for measuring neurotransmitter changes in the fruit fly.”

Virginia Commonwealth University, Richmond, VA, Nov. 19, 2009

“Electrochemical sensors for measuring neurotransmitter changes in the fruit fly brain”

GlaxoSmithKline, RTP, NC, Nov. 3, 2009

“The fruit fly as a model organism for neurotransmission and pharmacology”

University of North Carolina, Chapel Hill, NC, Nov. 2, 2009

“FSCV at Carbon-fiber microelectrodes: moving beyond dopamine”

Indiana University, Bloomington, IN, Oct. 1, 2009

“Electrochemical sensors for measuring neurotransmitter changes in the fruit fly brain”

University of Illinois, Chicago, Dept. of Chemistry, Sept. 24, 2008

“Electrochemical sensors for detection of real-time neurotransmitter changes in the fruit fly brain”

Mary Baldwin College, Staunton, VA, Sept. 18, 2008

“Using analytical tools to study brain chemistry”

Monitoring molecules *in vivo*, Vancouver, Canada, Aug. 12, 2008

“Increasing the sensitivity of carbon-fiber microelectrodes”

Purines 2008, Copenhagen, Denmark, July 1, 2008

“Electrochemical detection of adenosine *in vivo*”

University of Virginia, Department of Psychiatry, May 9, 2008

“Real-time detection of neurotransmitter changes: Applications for dopamine, serotonin, and amino acid measurements”

Eli Lilly & Company. Indianapolis, IN April 15, 2008

“Electrochemical sensors for detection of rapid neurotransmitter changes in the fruit fly”

Pittsburgh Conference on Analytical Chemistry, March 3, 2008

“Carbon nanotube modified electrodes for *in vitro* and *in vivo* monitoring of serotonin release”

Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Oct. 15, 2007

“Increasing the sensitivity of carbon-fiber microelectrodes for *in vivo* applications”

Southeast Regional Meeting of the American Chemical Society, Oct. 26, 2007

“Real-time measurements of adenosine *in vivo* using carbon-fiber microelectrodes”

University of Virginia, Molecular Physiology and Biophysics Seminar Series, Oct. 8, 2007.

“Real-time detection of neurotransmitter changes: Applications for dopamine, serotonin, and adenosine measurements”

University of North Carolina, Wightman Symposium, July 21, 2007.

“Increasing the sensitivity of carbon fiber microelectrodes for *in vivo* applications”

University of Virginia, Dept. of Anesthesiology Seminar Series, May 8, 2007

“Microelectrodes for studying rapid neurochemical changes: Applications for adenosine, dopamine and serotonin measurements.”

University of Virginia, Neuroscience Seminar Series, April 3, 2007

“Sensing and sampling techniques for measuring dynamic changes of neurotransmitters *in vivo*”

Pittsburgh Conference on Analytical Chemistry, Feb 28, 2007

“Carbon nanotube modified microelectrodes for rapid determination of neurochemical changes”,

Wake Forest University, Dept. of Chemistry, Feb. 8, 2006

“High speed separations for detection of fast neurochemical changes during behavior.”

Professional Memberships

American Chemical Society

Society for Neuroscience

Faculty for Undergraduate Neuroscience

Society for Electroanalytical Chemistry

Professional Service

Journal Advisory Board, *The Analyst* 2008-2010

NSF Review Panel 2008

Coordinator, Pittcon Networking Session for Young Faculty 2008

Selected Contributed Conference Abstracts

From work at Virginia:

M.J. Peairs and **B.J. Venton**. Detection of catecholamines with increased sensitivity and selectivity using single wall carbon nanotubes-overoxidized polypyrrole modified carbon fiber microelectrodes. *Pittsburgh Conference on Analytical Chemistry*, **2010**.

C.B. Jacobs and **B.J. Venton**. Characterization of microelectrodes modified by differently functionalized carbon nanotubes for the detection of neurotransmitters. *Pittsburgh Conference on Analytical Chemistry*, **2010**.

T.L. Vickrey and **B.J. Venton**. Evaluation of the autoreceptor function of D2-like receptors in *Drosophila* using fast scan cyclic voltammetry *Pittsburgh Conference on Analytical Chemistry*, **2010**.

B.J. Venton, K. Glanowska, S. Moenter. Rapid detection of oscillating concentrations of the peptide hormone Gonadotropin Releasing Hormone using carbon-fiber microelectrodes. *Pittsburgh Conference on Analytical Chemistry*, **2010**.

M.L. Huffman and **B.J. Venton**. Measurements of adenosine efflux in rat brain slices by fast-scan cyclic voltammetry. *Society for Neuroscience Meeting*, **2009**.

T.L. Vickrey and **B.J. Venton**. Measurements of dopamine in *Drosophila melanogaster* using fast-scan cyclic voltammetry. *Drosophila Neurobiology Meeting, Cold Spring Harbor*, **2009**.

T.L. Vickrey and **B.J. Venton**. Measurements of Dopamine in *Drosophila melanogaster* using Fast Scan Cyclic Voltammetry. *Virginia Academy of Sciences Meeting*. **2009**.

M.L. Huffman and **B.J. Venton**. Measurements of adenosine efflux in rat brain slices by fast-scan cyclic voltammetry. *Pittsburgh Conference on Analytical Chemistry*, **2009**.

T.L. Vickrey, X. Borue, and **B.J. Venton**. Measurements of dopamine in *Drosophila melanogaster* using fast-scan cyclic voltammetry. *Pittsburgh Conference on Analytical Chemistry*, **2009**.

C.B. Jacobs, N. Hershey, H.G. Park, and **B.J. Venton**. Increasing the sensitivity of catecholamine detection at carbon fiber microelectrodes by carbon nanotube dip-coating. *Pittsburgh Conference on Analytical Chemistry*, **2009**.

X. Borue and **B.J. Venton**. Rapid detection of extracellular serotonin in *Drosophila* larvae. *Society for Neuroscience Meeting*, **2008**.

S. Cechova and **B.J. Venton**. Adenosine A1 receptor mediate both electrically-stimulated dopamine and adenosine concentration in rat caudate-putamen. *Society for Neuroscience Meeting*, **2008**.

X. Borue and **B.J. Venton**. Quantitative evaluation of serotonin release and reuptake in *drosophila*. *Monitoring molecules in Neuroscience*, **2008**.

S. Cechova and **B.J. Venton**. Simultaneous measurements of dopamine and adenosine concentrations in the rat caudate-putamen. *Purines* **2008**.

M.L. Huffman and **B.J. Venton**. Comparison of Different Carbon Fiber Kinetics by Fast-Scan Cyclic Voltammetry, *Pittsburgh Conference on Analytical Chemistry*, **2008**.

S. Cechova and **B.J. Venton**. Detection of adenosine concentration changes with carbon microelectrodes using fast-scan cyclic voltammetry in striatum of anesthetized rats, *Society for Neuroscience Meeting*, **2007**.

X. Borue, S.E. Cooper, B. Condron, **B.J. Venton**. Rapid detection of extracellular dopamine levels in the fruit fly, *Society for Neuroscience Meeting*, **2007**.

B.E. Kumara Swamy and **B.J. Venton**. Rapid monitoring of adenosine concentrations with fast-scan cyclic voltammetry, *Pittsburgh Conference on Analytical Chemistry*, **2007**.

B.J. Venton and B.E. Kumara Swamy. Development of a carbon-fiber microelectrode sensor for sub-second detection of adenosine concentrations. *Society for Neuroscience Meeting*, **2006**.

Work previous to Virginia:

B.M. Kile, **B.J. Venton**, George Augustine, R. Mark Wightman. Evaluation of calcium dependent dopamine release in synapsin triple knockout mice. *Society for Neuroscience Meeting*, **2007**.

B.J. Venton, T.E. Robinson, R.T. Kennedy, S.E. Maren. Transient changes in glutamate and GABA release during acquisition and expression of conditioned fear. *Society for Neuroscience Meeting*, **2005**.

B.J. Venton, T.E. Robinson, R.T. Kennedy. Fast changes in amino acid neurotransmitters are correlated with stress behaviors: A microdialysis with online capillary electrophoresis study. *Pittsburgh Conference on Analytical Chemistry*, **2005**.

B.J. Venton, T.E. Robinson, R.T. Kennedy. Monitoring fast changes in amine neurotransmitters using microdialysis with on-line capillary electrophoresis detection. *American Chemical Society National Meeting*, Aug. **2004** (invited).

B.J. Venton, C.J. Watson, A.-N. Samaha, T.E. Robinson, R.T. Kennedy. Monitoring amine neurotransmitters in freely-moving rats using microdialysis with on-line capillary electrophoresis detection. *American Chemical Society Central Regional Meeting*, **2004** (invited).

B.J. Venton, P.E.M. Phillips, D. Gitler, W.C. Wetsel, G.J. Augustine, R.M. Wightman. Cocaine enhances dopamine release through mobilization of a synapsin-sensitive pool. *Society for Neuroscience Meeting*, **2003**.

B.J. Venton, R.M. Wightman. Correlation of extracellular oxygen and pH changes in the rat caudate-putamen. *Society for Neuroscience Meeting*, **2002**.

B.J. Venton, R.M. Wightman. Dopamine diffusion in the brain measured by amperometry. *Pittsburgh Conference on Analytical Chemistry*, **2002**.

B.J. Trafton, E.A. Boudygin, P.E.M. Phillips, D.L. Robinson. The pharmacodynamics of cocaine and GBR 12909: effect on evoked dopamine release measured by fast scan cyclic voltammetry *in vivo*. *Society for Neuroscience Meeting*, **2000**.