Ewan C. McNay

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Professional Experience:

University at Albany: **Assistant Professor, Behavioral Neuroscience, 2008-present**
Adjunct Assistant Professor, Biology, 2009-present
Member, Center for Neuroscience Research, 2008-present

Yale University: Adjunct Asst Professor, Behavioral Neuroendocrinology, 2008-present

- Investigation of amyloid effects on cognition and neural metabolism, including links to insulin signalling. Exploration of insulin's role in cognitive processes.
- Study of clinical and mechanistic links between Alzheimer's disease and type 2 diabetes.
- Determination of the effects of fatty acids on hippocampal function.
- Studies of the impact of insulin resistance and type 2 diabetes, and separately recurrent hypoglycemia, on cognitive and neural function.
- Exploration of endocrine modulation of brain metabolism.
- *In vitro* models of brain insulin function and recurrent hypoglycemia.

Yale University: Assistant Professor, Behavioral Neuroendocrinology, 2007 – 2008
Lecturer, Psychology, 2006
Associate Research Scientist, Endocrinology, 2004 – 2007

- Demonstration of the role of brain insulin, and of AMP kinase, in cognition.
- Examining the interaction of aging with diabetes/hypoglycemia in affecting cognition.
- Investigating the interaction of diabetes with Alzheimer's disease, and especially the intracerebral interaction of insulin and amyloid.
- Combining brain microdialysis with systemic glucose clamp methodology.

Yale University: Postdoctoral Fellow, 2001 – 04, with Robert S. Sherwin

- *In vivo* studies of the effects of hypoglycemia, both chronic and acute, on cognition and cognitive neurochemistry. Development of animal models of cognition in diabetes.

University of Illinois Urbana-Champaign: Visiting Faculty, Behavioral Neuroscience, 2001

- Investigation of the effects of pharmacological manipulations of memory on local brain metabolism and ECF glucose.
- Trained graduate students in methods of in vivo neurochemistry.

Yale University: Postdoctoral Fellow, Behavioral Neuroscience, 2000-01, with Tom Brown

- Training in neuronal electrophysiology, studying learning/memory.
- Whole-cell recording from amygdala and perirhinal cortex, including both characterization and synaptic plasticity/connectivity studies.

Darden Business School, University of Virginia: Postdoctoral Associate, 2000

- Development, statistical analysis and validation of self-assessment test methods.

Mary Baldwin College, Staunton, Virginia: Assistant Professor, Psychology, 1999

- Undergraduate teaching and research; development of class and laboratory materials.
- Creation and mentoring of undergraduate neuroscience research program.

Education:

Ph. D., Neuroscience, University of Virginia (1994 - 2000) in the laboratory of Paul E. Gold. Thesis topic: The contribution of metabolic processes to modulation of learning and memory.

B. Sc. Biochemistry (with Honours), University of Sheffield, U.K. (1989-1992).
Research on the structure and function of brain myelin-associated proteins.

Honors:

- **Invited speaker, New York Academy of Sciences, April 2013.**
- **University at Albany Outstanding Faculty Award, 2012.** Sole recipient of award from the Student Association.
- **MRC (U.K.) Study Section member, April 2013** (Neuroscience).
- **NIH Study Section member, June 2012** (Diabetes complications) and again **March 2013**.
- **'Most Influential Professor', University at Albany Honors College, 2012.**
- **NSF Review panel member, March 2012** (Modulation of neural function).
- **President, Society for Neuroscience Hudson Valley chapter, 2011-2013.** Leadership role for neuroscience in the region.
- **Invited speaker, Society for Neuroscience annual meeting, November 2011.**
  - Talk featured in profile in *Neurology Today*, January 2012.
- **Invited Chair, Society for Behavioral Neuroendocrinology annual meeting, June 2011.**
- **Psi Chi "Excellence in student research mentoring" award, May 2011.**
- **'Most Influential Professor', University at Albany Honors College, 2011.**
- **Invited Chair, American Psychological Association annual meeting, 2010.**
- **Alzheimer's Association Travel Fellow, 2010.** Funded to travel and address ICAD annual meeting in Honolulu.
- **Invited Panelist, NIDDK New PIs Workshop, 2010.**
- **'Most Influential Professor', University at Albany Honors College, 2010.**
- **Invited Panelist, NIH panel on CNS and Glycemic Control, 2009.** Workshop advised the NIH on the current state of research and key future needs.

- **Invited Chair, American Psychological Society annual meeting, 2009.** Organised, chaired and presented in session "Sugar, Sex and Stress: How hormones affect cognition."
  Featured session in APS Observer magazine, July 2009.
- **Frank Beach Award finalist, 2008.** Award for outstanding young investigators from the Society for Behavioral Neuroendocrinology.
- **Best paper, AIChE regional meeting, 2006.** This was awarded to the presentation on "Verifying Steady-State Assumptions in Laboratory Microdialysis" which reported work done in collaboration with colleagues in Chemical Engineering at Bucknell University.
  Also Finalist, Best Paper, AIChE national meeting.
- **Lindsley Prize finalist, 2000.** This is the Society for Neuroscience's award for the year's best thesis in the field of Behavioral Neuroscience.
- **Retired Faculty Award, University of Virginia** (university-wide competitive grant for aging research), 1997, and again in 1999.
- **Wallace Clemson Dissertation Fellowship**, **University of Virginia** (university-wide competitive fellowship), 1999.
- **Graduate School of Arts and Sciences Dissertation Scholarship, University of Virginia** (school-wide competitive scholarship), 1999.
- **Glenn/American Federation for Aging Research Scholar** (nationally competitive grant for research support), 1996.
- **Dean's Scholarship, University of Virginia** (university-wide competitive academic scholarship), 1994 - 2000.

I. RESEARCH

Grants and research support (does not include minor awards for e.g. student travel costs, dissertation support, etc)**:**

- **FRAP SUNY award (P.I. $10,000).** 5/2013 - 4/2015.

  "Evaluation of distinct amyloid forms in neuronal culture." Pilot award selected for high-impact potential.
- **NY CAP Research Alliance Award (Co-P.I. ~$110,000).** 10/2012 - 9/2013.

  "Novel Alzheimer's Antibodies." Award funds *in vivo* evaluation of novel engineered antibodies against specific amyloid forms as potential therapeutic agents. Collaborative proposal with RPI and Albany Medical Center.
- **American Diabetes Association Basic Science Award 7-12-BS-126 (P.I., ~$330,000).** 7/2012 - 6/2015.

  "Recurrent hypoglycemia and cognition." Award funds further characterisation of the neural and cognitive impact of insulin-induced recurrent hypoglycemia.
- **NIH R01 DK 077106 (P.I. ~$1.7 million).** 9/07 –6/2013.

"Insulin in the hippocampus: memory enhancement and impact of type 2 diabetes." Award funds investigation of the impact of systemic insulin resistance, as seen in Type 2 diabetes, on insulin's actions within the brain.

- **Alzheimer's Association Research Grant NIRG-10-176609 (P.I., $100,000).** 9/2010 – 9/2012.

  "Diabetes, insulin, amyloid and AD: cognitive and metabolic mechanisms." Award funds investigation into the links between insulin resistance and cerebral amyloid accumulation, with subsequent cognitive impairment

- **Psi Chi research fellowship (P.I., mentored; mentee Leslie Sandusky).** 1/2011 - 9/2011. Funded atomic absorption zinc analyses in collaboration with colleagues at Bucknell.

- **St. Rose research support (Co-I, P.I. Dr. Robert Flint).** June 2011. This supported purchase of microdialysis probes in an ongoing local collaboration.

- **Merck Indinavir support-in-kind (P.I.).** April 2011. Provided no-cost, pure drug product of a specific GluT4 modulator for use in ongoing studies.

- **NIH R01 MERIT DK20495, 2003-2013 (Co-I; P.I. Dr. Robert Sherwin. Scored in 1st percentile. ~$17 million total costs)**
  "Glucoregulatory Hormone Interactions in Diabetes." To determine the molecular mechanisms used by the brain's glucose-sensing neurons, and the ways in which brain metabolic sensing is impaired in diabetic patients.
  Ongoing collaboration, no longer receiving direct funding after moving to U. Albany.

- **Takeda Research Scholar, 2007-2008 (P.I., invited submission)**
  Provided support for investigation of the mechanisms underlying hippocampal insulin resistance, with a particular focus on determining whether TZD insulin sensitizers can alleviate cognitive impairment associated with Type II diabetes.

- **JDRF Scholar, 2006-2008 (P.I.)**
  Funded the study of how recurrent hypoglycemia impacts brain amyloid accumulation, a potential mechanism linking T1DM with risk of developing Alzheimer's.

- **NIH DERC Scholar, 2005-2007 (P.I.)**
  Funded: (1) development of microdialysis methods for proteins (specifically, insulin and beta-amyloid) within the brain, and (2) determination of the relationship between brain insulin levels and brain extracellular amyloid.
  Featured Investigator: ADA Research Magazine 'ForeFront,' Winter 2006.

- **ADA Junior Faculty Career Award, 2004-2006 (P.I.)**
  "Role of insulin in cognition and in mediating the cognitive effects of hypoglycemia." The major goal of this work was to investigate the role of insulin in modulation of hippocampal cognitive processes, and the interaction between hyperinsulinemia and hypoglycemia.
  Featured Investigator: ADA Research Magazine 'ForeFront,' Summer 2004.

- **JDRF Postdoctoral Fellowship, 2001-2003 (P.I.)**
  "Effects of hypoglycemia and insulin on cognition and cognitive neurochemistry." This award funded the first detailed investigations of the cognitive and metabolic impact of both

acute and recurrent hypoglycemia, as well as demonstrating that insulin could modulate hippocampal processes.

Publications ***(Student and postdoc co-authors indicated by *undergrad, **graduate student, and ***postdoc.)***

Peer-Refereed Papers:

Manuscripts currently under review or in final preparation:

Vinciguerra D*, Vigeant M, **McNay EC.**. Mathematical Model of Hippocampal Microdialysis: Validation of *in vivo* Methodology.

Cotero, V.E.***, Jorge, C* & **McNay, E. C.** Effect of varying fatty acid saturation on cognitive and metabolic effects of hippocampal administration.

Sandusky L**, **McNay EC.** Enhancement of spatial working memory by zinc administration.

Pearson-Leary J**, Sage J*, Vidal M*, **McNay EC.** Dissociations in hippocampal glucose transporter plasticity and insulin signalling following testing in two different behavioral tasks.

Pearson-Leary J**, Jahagirdar V***, George A*, Sage J*, Vidal M*, Hruz P, **McNay EC.**The insulin-regulated glucose transporter-4 is a critical regulator of hippocampally-dependent memory.

McNay, E. C., Green, P. S. & Craft, S. Recurrent hypoglycemia and central insulin resistance: diverse mechanisms producing hippocampal amyloid accumulation.

Chandler, D.* & **McNay. E. C.** Impact of recurrent hypoglycemia on amygdala function.

Chandler, D.* & **McNay. E. C.** Intra-amygdala insulin modulates food intake but not anxiolysis or memory processes.

Published research articles:

Sandusky L**, Flint R, **McNay EC.** Elevated glucose metabolism in the amygdala during an inhibitory avoidance task. *Behavioral Brain Research* (2013) 25:83-87.

Moy GA*, **McNay EC.** Caffeine reverses weight gain and cognitive impairment caused by a high-fat diet while elevating hippocampal BDNF. *Physiology & Behavior* (2013) 109:69-74.

McNay EC, Pearson-Leary J**. Hippocampal insulin microinjection and/or in vivo microdialysis during spatial memory testing. *Journal of Visualised Experiments* (2013) 71: e4451.

McNay EC, Kotz C., Levin BE, McCrimmon RJ, Sherwin RS. Recurrent hyperinsulinemic hypoglycemia produces marked obesity in the absence of altered food intake: a model for weight gain with intensive insulin therapy. *American Journal of Physiology* (2013) 304: E131-138.

Sandusky L**, Flint R, **McNay EC.** Effects of the Protein Synthesis Inhibitor Cycloheximide on Fear Extinction in an Animal Model of Post-Traumatic Stress. *Behavioral Brain Research* (2012) 231: 208–212.

Pearson-Leary J** & **McNay EC.** Acute oligomeric beta-amyloid administration impairs hippocampal cognitive processes and reduces insulin signalling. *Journal of Alzheimer's Disease* (2012) 29: 1-10.

This work was the topic of a broadcast documentary on my work, January 2013, on the Dutch television science program 'Labyrint.'

This work was also (together with McNay et al., 2010 below) featured on the cover of *New Scientist* magazine, September 2012 and in subsequent widespread online coverage**.**

Jahagirdar, V.*** , J. Ramcharitar* & **McNay, E. C.** Moderate recurrent hypoglycemia markedly affects judgement in a rodent model: cognitive and neurochemical effects. *The Open Diabetes Journal* (2012) 5: 1-7.

This work was the main basis of a profile of my work in *Neurology Today* (2012) 12(1); pp 17-18

Jahagirdar V***, **McNay EC.** Thyroid hormone as a potential modulator of hippocampal cognitive processes. *Metabolic Brain Disease* (2012) 27: 101-111.

McNay EC & Recknagel A**. Brain insulin signaling: a key component of cognitive processes and a potential basis for cognitive impairment in type 2 diabetes. (Reprint) *Neurobiology of Learning & Memory.* (2011) 96:517-28.

Alavian KN, **McNay E** et al. Bcl-x(L) regulates metabolic efficiency of neurons through interaction with the mitochondrial F(1)F(O) ATP synthase. *Nature Cell Biol*ogy (2011) 13: 1224-33

McNay EC & Recknagel A**. Brain insulin signaling: a key component of cognitive processes and a potential basis for cognitive impairment in type 2 diabetes. *Neurobiology of Learning & Memory.* (2011) 96:432-42.

McNay EC, Cotero VC***. Mini-review: Cognitive and Metabolic effects of recurrent hypoglycemia. *Physiology & Behavior* (2010) 100: 234-8 .

Shoup M**, Gallup AC**, Gallup G, **McNay EC.** Yawning and stretching predict brain temperature changes in rats: support for the thermoregulatory hypothesis. *Frontiers in Evolutionary Neuroscience* (2010) 2, article 108.

This paper received wide popular and online discussion, including for example
http://www.sciencenews.org/view/feature/id/73289/title/Yawn
http://www.sciencebase.com/science-blog/yawning-cools-the-brain.html .

Paranjape SA***, Chan O, Zhu W, Horblitt AM, **McNay EC**, Cresswell JA, Bogan JS, McCrimmon RJ, Sherwin RS Influence of Insulin in the Ventromedial Hypothalamus on Pancreatic Glucagon Secretion In Vivo. *Diabetes* (2010) 59: 1521-27.

McNay EC, Ong C*., McCrimmon RJ, Cresswell JA, Bogan JS, Sherwin RS. Hippocampal memory processes are modulated by insulin and high-fat-induced insulin resistance. *Neurobiology of Learning & Memory* (2010) 93: 546-53.

Discussed in 'The impact of insulin overload,' *Environmental Nutrition* (2011), 34 (8): 1-6.

Featured as cover story, 'Eat your way to dementia,' *New Scientist* (2012), 2880: 32-37, **with widespread subsequent discussion, including for example**
http://www.guardian.co.uk/commentisfree/2012/sep/10/alzheimers-junk-food-catastrophic-effect
http://www.motherjones.com/tom-philpott/2012/09/sugar-alzheimers
Featured in New York Times, subject of discussion/editorial piece
http://opinionator.blogs.nytimes.com/2012/09/25/bittman-is-alzheimers-type-3-diabetes/

Fan X, Ding Y, Brown S, Zhou L, Shaw M, Vella MC, Cheng H, **McNay EC**, Sherwin RS, McCrimmon RJ. Hypothalamic AMP-activated Protein Kinase activation with AICAR amplifies counterregulatory responses to hypoglycemia in a rodent model of Type 1 diabetes. *Am J Physiol Regul Integr Comp Physiol.* (2009) 296: R1702-R1708.

Page KA**, Williamson A, Yu N**, **McNay EC**, Dzuira J, McCrimmon RJ, Sherwin RS. Medium-chain fatty acids improve cognitive function in intensively treated type 1 diabetic patients and support in vitro synaptic transmission during acute hypoglycemia. *Diabetes* (2009) 58:1237-44.

McCrimmon RJ, Shaw M, Fan X, Cheng H, Ding Y, Vella MC, Zhou L, **McNay EC**, Sherwin RS. Key Role for AMP-Activated Protein Kinase in the Ventromedial Hypothalamus in Regulating Counterregulatory Hormone Responses to Acute Hypoglycemia. *Diabetes* (2008), 57:444-450.

Li H, Chen Y, Jones AF, Sanger RH, Collis LP, Flannery R, **McNay EC**, Yu T, Schwarzenbacher R, Bossy B, Bossy-Wetzel E, Bennett MV, Pypaert M, Hickman JA, Smith PJ, Hardwick JM, Jonas EA. BCL-xL induces Drp1-dependent synapse formation in cultured hippocampal neurons. *PNAS* (2008) 105(6): 2169-2174.

Herzog RI***, Chan O***, Yu S, Dziura J, **McNay EC**, Sherwin RS. Effect of acute and recurrent hypoglycemia on brain glycogen concentration. *Endocrinology* (2008) 149(4):1499-1504.

McNay EC. Insulin and ghrelin: peripheral hormones modulating memory and hippocampal function. *Current Opinion in Pharmacology* (2007) 7(6):628-32.

McNay, E. C., Williamson, A. W., McCrimmon, R. J., & Sherwin, R. S. Cognitive and neural hippocampal effects of long-term, moderate recurrent hypoglycemia. *Diabetes* (2006), 55(4):1088-95.

McCrimmon RJ, Song Z, Cheng H, **McNay EC**, Weikart-Yeckel C, Fan X, Routh VH, Sherwin RS. Corticotrophin releasing factor receptors within the ventromedial hypothalamus regulate hypoglycemia-induced hormonal counterregulation. *Journal of Clinical Investigation* (2006), 116(6):1723-30.

McNay, E.C., Canal, C**. Sherwin, R. S. & Gold, P.E. Modulation of memory with septal injections of morphine and glucose: Effects on extracellular glucose levels in the hippocampus. *Physiology & Behavior* (2006), 87(2):298-303.

Diano S, Farr SA, Benoit SC, **McNay EC**, da Silva I, Horvath B, Gaskin FS, Nonaka N, Jaeger LB, Banks WA, Morley JE, Pinto S, Sherwin RS, Xu L, Yamada KA, Sleeman MW, Tschöp MH, Horvath TL. Ghrelin controls hippocampal spine synapse density and memory performance. *Nature Neuroscience* (2006), 9(3):381-8.

McCrimmon, R.J., **McNay, E. C.** et al. Activation of AMP-Activated Protein Kinase Within the Ventromedial Hypothalamus Amplifies Counterregulatory Hormone Responses in Rats With Defective Counterregulation. *Diabetes* (2006), 55(6):1755-60.

McNay, E. C. The impact of recurrent hypoglycemia on cognitive function in aging. *Neurobiology of Aging* (2005), 26: S76-S79.

McCrimmon RJ, Evans ML, Fan X, **McNay EC**, Chan O, Ding Y, Zhu W, Gram DX, Sherwin RS. Activation of ATP-sensitive K+ channels in the ventromedial hypothalamus amplifies counterregulatory hormone responses to hypoglycemia in normal and recurrently hypoglycemic rats. *Diabetes* (2005), 54(11):3169-74.

Canal, C.**, **McNay, E.C.,** & Gold, P.E. Increases in extracellular fluid glucose levels in the rat hippocampus following an anesthetic dose of pentobarbital or ketamine-xylazine: an in vivo microdialysis study. *Physiology & Behavior* (2005), 84: 245-250.

Evans ML, McCrimmon RJ, Flanagan DE, Keshavarz T, Fan X, **McNay EC**, Jacob RJ, Sherwin RS. Hypothalamic ATP-sensitive K + Channels Play a Key Role in Sensing Hypoglycemia and Triggering Counterregulatory Epinephrine and Glucagon Responses. *Diabetes* (2004), 53: 2542-2551.

McNay, E. C. & Sherwin, R. S. From aCSF to aECF: Microdialysis perfusate composition effects on *in vivo* brain ECF glucose measurements. *Journal of Neuroscience Methods* (2004), 132(1):35-43.

McNay, E.C. & Sherwin, R. S. Effect of recurrent hypoglycemia on spatial cognition and cognitive metabolism in normal and diabetic rats. *Diabetes* (2004), 53(2):418-25.

McNay, E.C. & Brown, T. H. Preponderance of late-spiking neurons in lateral amygdala. *Cogprints* (2003), online: http://cogprints.ecs.soton.ac.uk/archive/00003067/

McCrimmon, R. J. Jacob, R. J., Fan, X., **McNay, E. C.** & Sherwin R. S. Effects of recurrent antecedent hypoglycaemia and chronic hyperglycaemia on brainstem extra-cellular glucose concentrations during acute hypoglycaemia in conscious diabetic BB rats. *Diabetologia* (2003). 46(12):1658-61.

McNay, E. C. & Gold, P. E. Food for thought: fluctuations in brain extracellular glucose provide insight into the mechanisms of memory modulation. *Cognitive and Behavioral Neuroscience Reviews* (2002), 1: 264-280.

Moyer, J. R. Jr., **McNay, E. C**., & Brown, T. H. Three classes of pyramidal neurons in layer V of rat perirhinal cortex. *Hippocampus* (2002), 12: 218-234.

McNay, E. C. & Gold, P. E. Age-related differences in hippocampal extracellular fluid glucose concentration during behavioral testing and following systemic glucose administration. *Journal of Gerontology* (2001), 56: B66-B71.

McNay, E. C., McCarty, R. C. & Gold, P. E. Fluctuations in brain glucose concentration during behavioral testing: dissociations between brain areas and between brain and blood. *Neurobiology of Learning and Memory* (2001), 75: 325-337.

McNay, E. C., Fries, T. M.* & Gold, P. E. Decreases in rat extracellular hippocampal glucose concentration associated with cognitive demand during a spatial task. *Proceedings of the National Academy of Sciences* (2000), 97: 2881-2885.

> **Reported in AP wire article and subsequently widely, including reports on the BBC, CNN, New York Times and translations into several languages.**

McNay, E. C. & Gold, P. E. Extracellular glucose concentrations in the brain - a response. *Journal of Neurochemistry* (1999), 73, 2222-2223.

McNay, E. C. & Gold, P. E. Extracellular glucose concentrations in the rat hippocampus measured by zero-net-flux: Effects of microdialysis flow rate, strain and age. *Journal of Neurochemistry* (1999), 72: 785-790.

McNay, E. C. & Gold, P. E. Memory modulation across neural systems: Intra-amygdala glucose reverses deficits caused by intra-septal morphine on a spatial task, but not on an aversive task. *Journal of Neuroscience* (1998), 18: 3853-3858.

McNay, E. C. & Willingham, D. B. Deficit in strategic motor skill learning, but not perceptuomotor recalibration, with aging. *Learning and Memory* (1998), 4: 411-420.

Book Chapter:

Gold P.E., **McNay E. C.**, et al. Neurochemical referees of dueling memory systems. In: Memory Consolidation: Essays in Honor of James L. McGaugh (2001) pp. 219-248.

Recent presentations (restricted to International and National meetings):

Invited seminar talks during **2008-2013** include Grand Rounds at Yale (twice), and talks at the Australian National University (Canberra), University of Minnesota, Albany Medical College, University of Pennsylvania, University of Virginia, INSERM (Paris), University of Cambridge (UK), Mount Sinai School of Medicine (NY), University of Miami (OH), Hunter College (NY), University of Dundee (UK), CNSE (Paris), and NJ University of Medicine and Dentistry.

Two poster presentations at the 2013 American Diabetes Association meeting, both with undergraduate and graduate student first-authors.

Invited talk: **E. C. McNay** & J. Pearson-Leary. Hippocampal GluT4 is a Critical Mediator of Cognitive Processes, Including the Role of Insulin in Memory Processing, and may Underpin Links Between T2DM and Alzheimer's Disease. *American Diabetes Association annual meeting, 2013.*

Two invited poster presentations at the 2012 Frontiers in Stress & Cognition conference, Ascona, Italy.

E.C. McNay. The role of insulin-regulated glucose transporter 4 in memory and insulin-mediated glucose uptake in the hippocampus. *American Diabetes Association annual meeting, 2012.* ***Featured oral presentation.***

Three separate poster presentations at the 2012 American Diabetes Association meeting, all with undergraduate and graduate student first-authors.

Invited talk: **E. C. McNay.** Recurrent hypoglycemia and cognitive function. *Society for Neuroscience annual meeting, 2011.*

Six separate poster presentations at the 2011 Society for Neuroscience meeting, all with undergraduate and graduate student first-authors.

Invited Talk: **E. C. McNay**. Insulin in the brain: heresy made orthodox? *INSERM Gerozissis lecture, Paris, France 2011.*

E. C. McNay. Hippocampal metabolism as a key effector mechanism for cognitive effects of both insulin and beta-amyloid. *ISCBFM annual meeting, 2011.*

L. Sandusky** & **E. C. McNay.** Metabolic alterations in the amygdala during consolidation and reconsolidation of an Inhibitory Avoidance task. *ISCBFM annual meeting, 2011.*

E. C. McNay. Exercising your brain: insulin and insulin resistance as cognitive modulators. *Society for Behavioral Neuroendocrinology annual meeting, 2011.* ***Oral presentation.***

Vinciguerra D*, Vigeant M, **McNay EC.**. Mathematical Model of Hippocampal Microdialysis: Validation of *in vivo* Methodology. *AIChE Annual Student Conference, 2011.*

J. Pearson-Leary** & **E. C. McNay** . Soluble oligomers of amyloid-beta 1-42 acutely impair spatial working memory, prevent task-associated hippocampal metabolism, and reduce membrane GluT4. *Society for Neuroscience annual meeting, 2010.*

A. Byrne***, J. Pearson-Leary** & **E. C. McNay** . Administration of soluble beta-amyloid 1-42 oligomers to the amygdala causes acute impairment of fear-motivated learning and insulin signalling. *Society for Neuroscience annual meeting, 2010.* ***Oral presentation.***

E. C. McNay & J. Pearson-Leary**. Amyloid-derived diffusible ligands acutely impair spatial memory and hippocampal insulin signalling. *International Conference on Alzheimer's Disease, 2010.* ***Oral Presentation.***

Featured presentation, Alzheimer Research Forum
http://www.alzforum.org/new/detail.asp?id=2518

E. C. McNay, P. Green & S. Craft. Recurrent hypoglycemia and central insulin resistance: diverse mechanisms producing hippocampal amyloid accumulation. *International Conference on Alzheimer's Disease, 2010.*

V. E. Cotero*** & **E. C. McNay**. Effect of intrahippocampal FAs with varied saturations on spatial memory in adult Sprague-Dawley rats. *Society for Neuroscience annual meeting, 2009.*

Featured presentation, SfN weblog: "Got diabetes on the brain."
http://scienceblogs.com/neurotopia/2009/10/sfn_neuroblogging_got_type_2_d.php

J. Pearson-Leary** & **E. C. McNay** .The effects of amyloid-derived diffusible ligands on spontaneous alternation behavior and insulin signalling. *Society for Neuroscience annual meeting, 2009.*

M. Shoup** & **E. C. McNay**. Yawning is a Brain Cooling Mechanism. *Annual Meeting of the Human Behavior and Evolution Society, 2009.*

Session Chair, 'Beyond the Hypothalamus - Other Sites Involved in Sensing and Responding to Recurrent Hypoglycemia.' *American Diabetes Association annual meeting, 2009.*

J. Pearson-Leary** & **E. C. McNay.** The Effects of Amyloid-Derived Diffusible Ligands on Spontaneous Alternation Behavior and Insulin Signalling. *Society for Behavioral Neuroendocrinology annual meeting, 2009.*

V. Jahagirdar***, J. Ramcharitar* & **E. C. McNay.** Effect of recurrent hypoglycemia on rule learning and mental flexibility. *Society for Behavioral Neuroendocrinology annual meeting, 2009.*

L. P. Collis**, **E. C. McNay** et al. The metabolic basis of BCL-xL dependent neuroprotection and neuronal signaling. *Society for Neuroscience annual meeting, 2008.*

Session Chair, 'Hypoglycemia in Animals - Sites of Impairment of Counterregulatory Responses.' *American Diabetes Association annual meeting, 2008.*

E. C. McNay, D. Chandler*, R.S. Sherwin. Modulation of Cognitive Function by Insulin and Recurrent Hypoglycemia: Dissociations between Hippocampus, Amygdala and Frontal Cortex. *American Diabetes Association annual meeting, 2008.*

K.A. Page**, **E. C. McNay** et al. Medium Chain Triglycerides Improve Memory Performance During Acute Hypoglycemia in Intensively Treated Type 1 Diabetics. *American Diabetes Association annual meeting, 2008.* ***Oral presentation.***

E. C. McNay. Insulin as a cognitive modulator: effects on amygdala vs. hippocampus. *Society for Neuroscience annual meeting, 2007.*

L.P. Collis**, **E. C. McNay** et al. BCL-xL alters metabolism of cultured hippocampal neurons. *Society for Neuroscience annual meeting, 2007.*

E. C. McNay, P.S. Green, S. Craft. T2DM and Alzheimer's: insulin and amyloid. *American Diabetes Association annual meeting, 2007.*

Session Chair, 'Hypoglycemia - Basic Neural Mechanisms and Anatomy.' *American Diabetes Association annual meeting, 2007.*

D. H. Van Wagener*, **E. C. McNay**, M. Vigeant. Verifying Steady-State Assumptions in Laboratory Microdialysis. *American Institute of Chemical Engineering annual meeting, 2006.* ***Best paper award.***

E. C. McNay, P.S. Green, S. Craft. Insulin and brain beta-amyloid: in vivo microdialysis studies. *Society for Neuroscience annual meeting, 2006.* ***Oral presentation.***

H. Fletcher**, J. Duo*, **E. C. McNay**, J. Stenken. Enhanced microdialysis relative recovery of proteins with affinity agents. *Society for Neuroscience annual meeting, 2006.*

E. C. McNay, D. H. Van Wagener*, M. Vigeant. Neuroscience for engineers: simulation modelling of brain microdialysis. *Society for Neuroscience annual meeting, 2006.* ***Teaching presentation.***

H. Fletcher**, **E. C. McNay**, J. Stenken. Microdialysis enhancement of rat endocrine peptide recovery. *American Chemical Society annual meeting, 2006.*

R. I. Herzog***, **E. C. McNay** et al. Effect of Acute and Recurrent Hypoglycemia on Regional Changes in Brain Glycogen Concentration. *American Diabetes Association annual meeting, 2006.*

E. C. McNay, R. I. Herzog***, R. J. McCrimmon, R. S. Sherwin. Systemic Insulin Resistance Alters Cognitive and Metabolic Responses to Intrahippocampal Insulin. *American Diabetes Association annual meeting, 2006.*

Invited Talk: **E. C. McNay**. Recurrent hypoglycemia and hippocampal cognitive processes. *Bar Harbor 'SPARK' meeting on Obesity, Mood, and Cognition, 2005.*

E. C. McNay, R. Herzog***, R. J. McCrimmon, R. S. Sherwin. Modulation of hippocampally-mediated cognition by insulin. *European Association for the Study of Diabetes meeting, 2005.*

R.J. McCrimmon, **E. C. McNay.** C. Yeckel, Z. Song, V.H. Routh, R.S. Sherwin. Role for the CRH-2 receptor in the ventromedial hypothalamus in modulating counterregulatory responses to hypoglycemia. *Society for Neuroscience annual meeting, 2005.*

E.C. McNay, R.I. Herzog***, R.J. McCrimmon, R.S. Sherwin. Intrahippocampal insulin administration: Cognitive and metabolic effects. *Society for Neuroscience annual meeting, 2005.* ***Oral presentation.***

Invited Talk: **E. C. McNay**. No sugar, no enlightenment. *Winter Conference on Brain Research, 2005.*

E. C. McNay, R. J. McCrimmon, R. S. Sherwin. Acute Intrahippocampal Insulin Enhances Spatial Cognitive Performance. *American Diabetes Association annual meeting, 2005.* ***Oral presentation.***

II. TEACHING & MENTORING

Teaching Experience/Evaluations:

University at Albany:

- **APSY 780, Brain metabolic and cognitive processes.** Graduate class. This is a new class to the university, covering material not previously offered. Average overall student rating received: **1.00** and on scale of 1.00 - 5.00, 1.00 being the best possible.

- **APSY 214, Behavioral Neuroscience.** Undergraduate, introductory neuroscience class, wide range of abilities and prior experience/knowledge. Average overall student ratings **1.52** and **1.43**; historical average for class 1.73.

- **APSY 314, Advanced Behavioral Neuroscience.** Undergraduate class: small-group, highest-level undergraduate neuroscience class offered, including significant primary research source material, literature review and independent papers. Average overall ratings of **1.82, 1.29, 1.00** and **1.00**, compared to historical average of 1.41.

- **APSY/ABIO 490, Topics in Neuroscience.** Undergraduate class. This is the capstone course for the new Neuroscience minor, developed for the first time in 2010 and team-taught with other members of the Neuroscience faculty. No formal ratings given.

- **TPSY214, Honors Behavioral Neuroscience.** Honors teaching is competitive and selective, on the basis of student ratings and rigor of instruction. This class has filled in the first minute of availability and was selected for repeated scheduling in each sbsequent year.

In addition, I currently (June, 2013) have 4 graduate and 7 undergraduate students doing research for credit in my lab (**BIO399/499, APSY297/397/497)**, and additional undergraduates performing research without class credit.

Yale University:

- Designed, prepared and taught '**Behavioral Neuroscience**,' Fall 2006. Core course for Psychology majors. Midterm evaluations excellent, and enrollment during the 'shopping' period doubled that of the previous year. End of year evaluations: median ranking of 'excellent.' [This was the best possible ranking.]

- Contributed to Yale undergraduate classes in statistics and research methods, and to medical school teaching.

- Invited guest lecturer in '**Functional Neuroanatomy**,' Hunter College, Spring 2007. Rated 'excellent.'

Mary Baldwin College.

- Designed, prepared and taught both '**Introduction to Psychology**' and '**Research Methods and Statistics**'. Both classes involved the design and teaching of lab sections each week in addition to the lecture series. Student ratings of 'excellent' (best possible) for both quality of teaching and effectiveness in all sections of both classes. I developed from scratch and taught both classes, including accompanying laboratory sections.

- Initiated and mentored an undergraduate neurochemistry research program.

University of Virginia.

- T.A., '**Research Methods and Statistics**' (undergraduate), 1996-97 and 1997-98; overall teaching effectiveness median rating 1.00 (best possible on scale from 1.00 to 5.00, 1.00 being 'excellent'). Rated best T.A. (of six) both years.

- T.A., '**Topics in Neuroscience**' (graduate), 1998 and 1999: informal rating of 'excellent'.

- Ad-hoc lecturer, '**Fundamentals of Neuroscience**' (graduate), 1999. No ratings given.

- Developed, tested and presented several case studies to the graduate classes at Virginia's Darden School of Business.

<u>Mentoring:</u>

Research mentor to postdoctoral researchers, University at Albany:

- Vaishali Jahagirdar, PhD (2008-2011). Vaishali accepted a Research Specialist position in Neuroscience in May 2011 and is now faculty at Excelsior College.
  - **Vaishali's research presentation won the Cheryl Tieman award from N.E.U.R.O.N. in May 2010.**
- Victoria Cotero, PhD. (2009-2010). Victoria accepted a research position at GE Global Research in June 2010.
- Nilem Patel, MD (2009). Nilem returned to her medical residency as of December 2009.

Research mentor and/or external examiner to doctoral candidates:

- Melanie Shoup (Ph.D. Psychology, U. Albany, 2008 - 2011).
  - **Melanie accepted a faculty position at the University of Pittsburgh. She won several research and travel awards while in my lab.**
- Jiah Pearson-Leary (Ph.D. Psychology, U. Albany, 2008 - 2013).
  - **Jiah accepted a postdoc at U. Penn.**
- Leslie Sandusky (Ph.D. Psychology, U. Albany, 2009 - present).
  - **Leslie has won multiple research and travel awards while in the lab, including a prestigious Psi Chi award.**
- Andrew Recknagel (M.A. Psychology, U. Albany, 2009 - 2011)
- Danielle Osborne (Ph.D. Psychology, U. Albany, 2011 - present)
- Nicole Jurdak (Ph.D., Neuroscience, Tufts University, 2009 - present)
- Alexandre Muller (Ph.D. Biochemistry, Universidade Federal do Rio Grande do Sul, 2010-2011).
  - **Alex returned to Brazil to accept a faculty position.**
- Heidi Fletcher (Ph.D., Biomedical Engineering) Rensselaer Polytechnic Institute, 2008.
- Ruani Fernando (Ph. D., Neuroscience), University of Melbourne, Australia, 2006. Ruani completed a post-doctoral fellowship at the Karolinska Institutet (Stockholm, Sweden) and is now a Research Fellow at the Howard Florey Institute (Melbourne, Australia).

- Clinton Canal (Ph. D., Psychology), University of Illinois at Urbana-Champaign, 2006. Clint completed a postdoctoral fellowship at Vanderbilt University, and is now a Research Fellow at the University of Florida.

I also served on the dissertation committee for Keith Gonzales (Ph.D., Psychology, U. Albany, 2009 - present), and currently serve on committees for Jeremy Atkinson (2010-present) and Jari Willing (2011-present).

Research mentor/supervisor for undergraduates:

- Justin Ramcharitar (U. Albany, 2008 - 2010)
  - **Justin was the first graduate from my lab at Albany, in May 2010, and his work in my lab won the Albany Presidential Research Award, an Undergraduate Endowed Research Fellowship, and the Psychology Department Outstanding Research Award.**
- Andrew Byrne, Cyndel Carreau, Christine Jorge (U. Albany, 2009 - 2011)
  - **Both Cyndel and Christine won Albany Presidential Research Awards for their work in my lab, 2011.**
  - **Cyndel also won an Undergraduate Endowed Research Fellowship, and won the Biology 'Outstanding Student Research' award for 2011.**
  - **Andrew was an invited research blogger for the Dana Foundation (see e.g.** http://danapress.typepad.com/weblog/2010/08/immunization-for-alzheimers-disease.html**)**
  - **All graduated May 2011.**
- Michael Vidal, Gregory Moy, Amy Santaniello, Jessica Sage, Rachel Tobin (U. Albany, 2010-2012)
  - **Gregory won the Spellman Academic Achievement Award, a President's Award for Academic Leadership, the Biology Undergraduate Research Award and a Life Sciences Research Presentation Award**
- Damon Vinciguerra (Bucknell, 2010-2012)
  - **Damon won the AIChE Outstanding Presentation Award <u>twice</u> for projects done in collaboration with my lab at Albany.**
- Cecilia Ong (Yale, 2006 - 2008). Cecilia is now a medical student at Duke University.
- Daniel Chandler (Hamilton College; work done at Yale, 2006-2008). Dan is now a medical student at Drexel University.
- Thomas Fries (University of Virginia, 1999-2000). Tom completed his M.B.A. and is now a Research Fellow at the Bertelsmann Foundation.

III. SERVICE

Professional Service:

- **Founded, organized and chaired the Brain Glucose Group series of symposia** (August 2001 to present, with 20 completed symposia to date).
  This symposium series brings together 30-50 researchers from across the U.S. who share a research interest in the brain's use of glucose, including glucose-sensing mechanisms and the sequelae of hypoglycemia and/or diabetes. Meetings are held three to four times annually, with the venue rotating between participating institutions.

- **Grant reviewer**, 2001 to present: NSF, JDRF, NIMH, NIDDK, ADA, AFAR, University of Washington, Alzheimer's Association.
  - **National grant panel member**, 2013: Medical Research Council (U.K.)
  - **National grant panel member**, 2012-2013: Portuguese Foundation for Science and Technology and Romanian Institute of Science and technology
  - **NSF panel member**, 2012: Modulation of cognitive and neural function.
  - **NIH panel member**, 2012 to present: Diabetes Complications Consortium.

- **Peer reviewer**, 2000 to present: *Psychoneuroendocrinology, Journal of Neuroscience, Neurobiology of Learning and Memory, Neuropsychologia, Psychology and Aging, Journal of Neurochemistry, Journal of Neurophysiology, Diabetes, Brain Research, Synapse, Diabetes Care, Nature Neuroscience, PLoS Biology, Experimental Medicine, Diabetologia, Endocrinology, Animal Cognition, Neuroscience, Brain Research Bulletin, British Journal of Pharmacology, Perspectives on Psychological Science, Neuroscience & Biobehavioral Reviews, Trends in Neuroscience.* I average 2-3 reviews per month.

- **Editorial Board member**, 2009-present: *The Open Diabetes Journal.*

- **Section organiser, American Diabetes Association meeting, 2009.** Designed sessions and plenary talks, invited speakers, selected abstracts, etc.

University Service:

- **Member, University IACUC committee (2011-present).** This committee is responsible for oversight of all animal research at the University.
  - **I will Chair this committee from Fall 2013.**

- **Faculty mentor, Neuroscience society, 2010-present.** This undergrad organisation promotes iscussion of neuroscience topics and research

- **Member, faculty diversity panel (2012).** This panel was charged with evaluating current faculty diversity practices and maing recommendations for improvement.

- **Chair, Life Sciences Research Symposium (2011).** Both organisation and on-site chairing.

- **Co-chair, 2nd annual Life Sciences Research Symposium (2010).** This day of presentations and discussion brings together life science researchers from across the University; together with Mindy Larsen, I designed, organised and chaired the symposium.

- **Member, CLUE panel on faculty retention (2010-11).** This University-level panel is charged with evaluating current retention performance and identifying ways to improve faculty retention.

- **Member, Veterinary Director search committee (2009-10).** This committee successfully identified and recruited a University-wide Director of Animal Services.

Department Service:

- **Chair, Psychology Colloquium committee (2008-2010).**

- **Member, Psychology Graduate committee (2009-present).**

- **Member, Psychology Executive committee (2011-2012).** I served as the sole non-Section Head member of the committee.

- **Lawrence & Marie Shore scholarship review (2012).** Departmental representative in the temporary absence of a Chair.

In addition to these formal roles, I have represented the department at e.g. University candle-lighting ceremonies (2009-11), move-in day (2009-10), and recruitment events (2010-11); and have served on University-level panels such as 'Preparing Future Faculty'.

Professional affiliations:

- Society for Neuroscience
- American Diabetes Association
- Association for Psychological Science
- American Psychological Association
- New York Academy of Science
- Alzheimer's Association