GREGORY T. MACLEOD

CURRICULUM VITAE

Associate Professor
Department of Biology
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Education

Ph.D.	University of Sydney	1995-99	Neuroscience
M.B.A.	AGSM - Australian Graduate School of Management	1989-90	General Management
B.Sc. Hons.	University of Sydney	1986	Plant Physiology & Biophysics
B.Sc.	University of Sydney	1983-85	Cell Biology & Plant Physiology

Research & Professional Experience

Associate Professor	2013-present	Florida Atlantic University, Department of Biology Jupiter, FL. USA
Assistant Professor	2006-13	UTHSCSA, Department of Physiology San Antonio, TX. USA
Postdoctoral Fellow	2004-06	University of Arizona, Division of Neurobiology mentor: **Konrad E. Zinsmaier**
Postdoctoral Fellow	2000-04	University of Toronto, Department of Physiology mentors: **Harold L. Atwood** & **Milton P. Charlton**
Postdoctoral Fellow	1999-00	University of Sydney, Department of Physiology mentor: **Maxwell R. Bennett**
Research Assistant (Graduate Studies)	1994-99	University of Sydney, Department of Physiology supervisor: **Maxwell R. Bennett**
Management / Consulting	1991-93	Dalton Pacific, DataView Solutions, Godfrey Pembroke Sydney, Australia
Research Assistant	1987-88	University of Sydney, Neurobiology Research Centre supervisor: **Maxwell R. Bennett**

Memberships in Professional and Scientific Societies

The Genetics Society of America
The Society for Neuroscience

Peer Review Service

Funding Agencies

National Institute of Health (NIH) – (CMND) 2012, 2013 (panel member)
National Science Foundation (NSF) – (IOS) 2008, 2009, 2010 (ad hoc)
– (IOS) 2011, 2012 (panel member)
American Heart Association (AHA) – (BRAIN 5) 2013 (panel member)
Italian Ministry of Health (MOH) – 2010, 2011 (ad hoc)

Journals

Brain Research
Frontiers in Synaptic Neuroscience
Journal of Insect Physiology
Journal of Neurophysiology
Journal of Neuroscience
Neurochemistry International
Synapse

Research Articles

1. Sakellariou G.K., Davis C.S., Shi Y., Ivannikov M.V., Zhang Y., Vasilaki A., Macleod G.T., Richardson A., Van Remmen H., Jackson M.J., McArdle A. & Brooks S.V. (2014) Neuron-specific expression of CuZnSOD prevents the loss of muscle mass and function that occurs in homozygous CuZnSOD knockout mice. **FASEB Journal**, *in press*.

2. Ivannikov M.V. & Macleod G.T. (2013) Mitochondrial free Ca^{2+} levels and their effects on energy metabolism in *Drosophila* motor nerve terminals. **Biophysical Journal**, 104, p.2353-2361.

3. Rossano, A.J., Chouhan A.K. & Macleod G.T. (2013) Genetically-encoded pH-indicators (GEpHIs) reveal activity-dependent cytosolic acidification of *Drosophila* motor nerve termini *in vivo*. **Journal of Physiology**, 591, 1691-1706.

4. Rawson, J.M., Kreko, T., Davidson, H., Mahoney, R., Bokov, A., Chang, L., Gelfond, J., Macleod G.T. & Eaton, E.A. (2012) Effects of diet on synaptic vesicle release in dynactin complex mutants: a mechanism for improved vitality during motor disease. **Aging Cell**, 11, 418-427.

5. Chouhan A.K., Ivannikov M.V., Lu Z., Sugimori M., Llinas R.R. & Macleod G.T. (2012) Cytosolic calcium coordinates mitochondrial energy metabolism with presynaptic activity. **Journal of Neuroscience**, 32, 1233–1243.

6. George A.A., Macleod G.T. & Zakon H.H. (2011) Calcium-dependent phosphorylation regulates neuronal stability and plasticity in a highly precise pacemaker nucleus. **Journal of Neurophysiology**, 106, 319–331.

7. Shakiryanova D., Morimoto T., Zhou C., Chouhan A.K., Sigrist S.J. Nose A., Macleod G.T., Deitcher D.L. & Levitan, E.S. (2011) Differential control of presynaptic CaMKII activation and translocation to active zones. **Journal of Neuroscience**, 31, 9093–9100.

8. Chouhan A.K., Zhang J., Zinsmaier K.E. & Macleod G.T. (2010) Presynaptic mitochondria in functionally different motor neurons exhibit similar affinities for Ca^{2+} but exert little influence as Ca^{2+} buffers at nerve firing rates *in situ*. **Journal of Neuroscience**, 30, 1869-1881.

9. Ivannikov M.V., Harris K.M. & Macleod G.T. (2010) Mitochondria: enigmatic stewards of the synaptic vesicle reserve pool. **Frontiers in Synaptic Neuroscience**, 2, Article 145.

10. Russo G.J., Louie K., Wellington A., Macleod G.T., Hu F., Panchumarthi S., & Zinsmaier K.E. (2009) *Drosophila* Miro is required for both anterograde and retrograde axonal mitochondrial transport. **Journal of Neuroscience**, 29, 5443-5455.

11. Lagow R.D., Bao H., Cohen E.N., Daniels R.W., Zuzek A., Williams W.H., Macleod G.T., Sutton R.B. & Zhang B. (2007) Modification of a hydrophobic layer by a point mutation in syntaxin 1A regulates the rate of synaptic vesicle fusion. **PLoS Biology**, 5(4), e72.

12. Macleod G.T. & Zinsmaier K.E. (2006) Synaptic homeostasis on the fast track. **Neuron**, 52, 569-571.

13. Macleod G.T., Chen L., Karunanithi S., Peloquin J.B., Atwood H.L., McRory J.E., Zamponi G.W. & Charlton M.P. (2006) The *Drosophila cac*^{ts2} mutation defines an element critical for inactivation in $Ca_v2.1$ channels. **European Journal of Neuroscience**, 23, 3230-3244.

14. Guo† X., Macleod† G.T., Wellington A., Hu F., Panchumarthi S., Schoenfield M., Marin L., Charlton M.P., Atwood H.L. & Zinsmaier K.E. (2005) The GTPase dMiro is required for axonal transport of mitochondria to *Drosophila* synapses. **Neuron**, 47, 379-393. † *Equal author contribution*.

15. Bao H., Daniels† R.W., Macleod† G.T., Charlton M.P., Atwood H.L. & Zhang B. (2005) AP180 maintains the distribution of synaptic and vesicle proteins in the nerve terminal and indirectly regulates the efficacy of Ca^{2+}-triggered exocytosis. **Journal of Neurophysiology**, 94, 1888-1903. † *Equal author contribution.*

16. Babcock M., Macleod G.T., Leither J. & Pallanck L. (2004) Genetic analysis of soluble N-ethylmaleimide-sensitive factor attachment protein function in *Drosophila* reveals positive and negative secretory roles. **Journal of Neuroscience**, 24, 3964-3973.

17. Macleod G.T., Marin L., Charlton M.P. & Atwood H.L. (2004) Synaptic vesicles: test for a role in presynaptic calcium regulation. **Journal of Neuroscience**, 24, 2496-2505.

18. Macleod G.T., Suster M.L., Charlton M.P. & Atwood H.L. (2003) Single neuron activity in the *Drosophila* larval CNS detected with calcium indicators. **Journal of Neuroscience Methods**, 127, 167-178.

19. Macleod G.T., Hegstöm-Wojtowicz M., Charlton M.P. & Atwood H.L. (2002) Fast calcium signals in *Drosophila* motor neuron terminals. **Journal of Neurophysiology**, 88, 2659-2663.

20. Macleod G.T., Dickens P.A. & Bennett M.R. (2001) Formation and function of synapses with respect to Schwann cells at the end of motor-nerve terminal branches on mature amphibian (*Bufo marinus*) muscle. **Journal of Neuroscience**, 21, 2380-92.

21. Bennett M.R., Farnell L., Gibson W.G., Macleod G.T. & Dickens P. (2000) Quantal potential fields around individual active zones of amphibian motor-nerve terminals. **Biophysical Journal**, 78, 1106-1118.

22. Macleod G.T., Gan J.B. & Bennett M.R. (1999) Vesicle-associated proteins and quantal release at single active zones of amphibian (*Bufo marinus*) motor-nerve terminals. **Journal of Neurophysiology**, 82, 1133-1146.

23. Macleod G.T., Farnell L., Gibson W.G. & Bennett M.R. (1999) Quantal secretion and nerve-terminal cable properties at neuromuscular junctions in an amphibian (*Bufo marinus*). **Journal of Neurophysiology**, 81, 1135-1146.

24. Macleod G.T., Khurana V., Gibson W.G. & Bennett M.R. (1998) Probability of quantal secretion and the mobilization of vesicles at the active zones of endplates. **Journal of Theoretical Biology**, 191, 323-324.

25. Macleod G.T., Lavidis N.A. & Bennett M.R. (1994) Calcium dependence of quantal secretion from visualized sympathetic nerve varicosities on the mouse vas deferens. **Journal of Physiology**, 480, 61-70.

Invited Book Chapters and Methods Articles

26. Macleod G.T. (2012) Calcium Imaging at the *Drosophila* Larval NMJ. **Cold Spring Harbor Protocols**, No.7. July 2nd.

27. Macleod G.T. (2012) Topical Application of Indicators for Calcium Imaging at the *Drosophila* Larval NMJ. **Cold Spring Harbor Protocols**, No.7. July 2nd.

28. Macleod G.T. (2012) Forward-Filling of Dextran-Conjugated Indicators for Calcium Imaging at the *Drosophila* Larval NMJ. **Cold Spring Harbor Protocols**, No.7. July 2nd.

29. Macleod G.T. (2012) Direct Injection of Indicators for Calcium Imaging at the *Drosophila* Larval NMJ. **Cold Spring Harbor Protocols**, No.7. July 2nd.

30. Macleod G.T. (2012) Imaging and Analysis of Nonratiometric Calcium Indicators at the *Drosophila* Larval NMJ. **Cold Spring Harbor Protocols**, No.7. July 2nd.

31. Macleod G.T. (2010). Calcium Imaging. In, M. Freeman, S. Waddell, & B. Zhang (Eds.), ***Drosophila* Neurobiology Methods: A Laboratory Manual**. Woodbury, NY. Cold Spring Harbor Laboratory Press.

32. Rossano A.J. & Macleod G.T. (2007) Loading *Drosophila* nerve terminals with Ca^{2+}-indicators. **Journal of Visualized Experiments**, 6. http://www.jove.com/video/250

Research Funding

Current Extramural Funding

Title: The Multiple Roles of Mitochondria in Synaptic Transmission
Reference: NIH R01 NS061914
Role: PI (30% effort)
Date: 29/09/2008-06/30/2017
Granting Agency: National Institute of Neurological Disorders and Stroke (NINDS)

Title: Probing the Synapse for pH Microdomains
Reference: **NIH R21** NS083031
Role: PI (15% effort)
Date: 08/15/2013-08/31/2015
Granting Agency: National Institute of Neurological Disorders and Stroke (NINDS)

Title: Optical Control and Reporting of Cytosolic and Organellar pH *in situ*
Reference: NSF EAGER IOS - 1147467
Role: PI (10% effort)
Date: 08/01/2011-07/31/2013 – *Currently in No Cost Extension*
Granting Agency: Integrative Organismal Systems, National Science Foundation (NSF)

Submitted Proposals for Extramural Funding – AWAITING RE-REVIEW

Title: Molecular Mechanisms of Neuromuscular Interactions Underlying Age-Related Atrophy
Reference: **NIH P01** AG020591-11
Role: Co-PI (10% effort)
Date: requested - 07/01/2014-06/30/2019
Granting Agency: National Institute on Aging (NIA)

Teaching

At **Florida Atlantic University** I am teaching the Honors Cell Biology course (PCB4102) at the Harriet L. Wilkes Honors College on the MacArthur campus at Jupiter.

At the **UTHSCSA**, I was involved in 5 courses either as a lecturer or a director, with over 20 contact hours per year as a lecturer and directing two courses with a total of 52 contact hours. I also continue to direct the *Drosophila* Neurobiology summer course at the **Cold Spring Harbor Laboratory** (CSHL) with 160 contact hours.

Recent Course Based Teaching at UTHSCSA

INTD5000 - Fundamentals of Bio-Medical Science
INTD5040 - Molecular, Cellular and Developmental Neuroscience
PHYL5043 - Respiratory and Renal Physiology
CSBL6021 - Animals Models
INTD6008 - Advanced Cell and Molecular Biology: Mitochondria

Recent Courses Directed at UTHSCSA

PHYL5041 - Excitable Membranes (2010 - 2013)
INTD5040 - Molecular, Cellular and Developmental Neuroscience (2009 - 2013)

Recent Mentoring at UTHSCSA

i) At UTHSCSA I was mentoring two graduate students (Zhongmin Lu, PhD and Adam Rossano, MD/PhD programs) and one postdoctoral fellow (Dr. Maxim Ivannikov) on a day-to-day basis.
ii) I regularly mentored rotation students from the MS for K-12, PhD and MD/PhD programs.
iii) I mentored students from the B-SURE (undergraduate students), PURE (undergraduate students), MSSRP (medical students) and Voelcker Programs (high school students).

Current Teaching at Cold Spring Harbor Laboratory

In late 2011, in collaboration with Drs. Kate O'Connor-Giles, Adrian Rothenfluh and David Stewart, I redesigned the curriculum for the *Drosophila* Neurobiology course [held every summer for 29 years at Cold Spring Harbor Laboratory (CSHL), Long Island, NY]. The course was redesigned to find new funding after funding from NIH (NIMH) was withdrawn. We were successful at attracting funding for the next five years from NIH (NIDA) and NSF (IOS). As a result, the course will continue to educate some of the brightest in the field of *Drosophila* Neurobiology. I have co-directed the course for two years and will direct the course once more in 2014: http://meetings.cshl.edu/courses/2014/c-dros14.shtml

Graduate Student Committees at UTHSCSA

Qualifying Examinations		Dissertation Committees	
Dustin Green	Jun. 2011	Leo Chang	Dec. 2009 – Dec. 2012
Jie Zhang	May 2009	Jie Zhang	Oct. 2009 – Nov. 2011
Si-Eun Yoo	Apr. 2009	Yu Tao	Jun. 2009 – Oct. 2012
Wei Liu	Oct. 2008	Wei Zheng	Apr. 2008 – July 2012
Yu Tao	Jul. 2008	Sandra Chocron	Apr. 2007 – Apr. 2010
Wei Zheng	Sep. 2007		

Training of non UTHSCSA personnel

The following have visited my laboratory here at the UTHSCSA, for periods of up to two weeks, either to learn techniques developed by my laboratory, or to perform collaborative work.

1. Audrey Chen, Grad Student - (**UCLA**; mentor David Krantz)
2. Andrew George, Grad Student - (**UT Austin**; mentor Harold Zakon)
3. Balaji Iyengar, PhD - (**U Toronto**; mentor Harold Atwood)
4. Manish Jaiswal, Grad Student - (**BCM**; mentor Hugo Bellen (HHMI))
5. Christian Simon, Grad Student – (**Würzburg U** - Germany; mentor Michael Sendtner)
6. Yogesh Wairkar, PhD - (**Wash U**–St Louis; mentor Aaron DiAntonio)
7. Trevor Wardill, PhD - (**Janelia Farm**; mentor Vivek Jayaraman (HHMI))
8. Ching-On Wong, PhD - (**UTHSC Houston**; mentor Kartik Venkatachalam)

Recent Invited Talks

What can fruit flies tell us about mitochondrial function in nerve terminals? – September 2013
The National Institutes of Health. Host – Mihaela Serpe

What can fruit flies tell us about mitochondrial function in nerve terminals? – Apr 2013
The Oklahoma Medical Research Foundation. Host – Luke Szweda

What can fruit flies tell us about mitochondrial function in nerve terminals? – Apr 2013
Florida Atlantic University, Jupiter, FL USA. Host – Rod Murphey

What can Drosophila motor nerve terminals tell us about presynaptic bioenergetics? – Feb 2013
The University of Texas Medical Branch at Galveston, TX, USA. Host – Yogesh Wairkar

What can Drosophila motor nerve terminals tell us about presynaptic bioenergetics? – Dec 2012
The Garvan Institute, Sydney, Australia. Host – Greg Neely

What can Drosophila motor nerve terminals tell us about presynaptic bioenergetics? – Nov 2012
The University of Texas at Brownsville. Host – Emilio Garrido-Sanabria

What can Drosophila motor nerve terminals tell us about presynaptic bioenergetics? – Sept 2012
The Scripps Research Institute, Jupiter, FL USA. Host - William Ja

Re-examining the Role of Neuronal Mitochondria: Implications for Neurodegeneration – Feb. 2012
Central University of the Caribbean, San Juan, Puerto Rico. Host - Maria Bykhovskaia