

## Michael Gregory Borland, Ph.D.

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### **CURRENT POSITION**

Assistant Professor of Chemistry & Biochemistry  
Bloomsburg University of Pennsylvania (BU)

Fall 2011 - Current

### **EDUCATION/TRAINING**

#### **POSTDOCTORAL SCHOLAR**

Mentor: Dr. Jeffrey M. Peters, The Pennsylvania State University (PSU)

January - June 2011

#### **GRADUATE**

The Pennsylvania State University, University Park Campus

December 2010

Ph.D. in Biochemistry, Microbiology, and Molecular Biology (BMMB)

National Science Foundation (NSF) Graduate Research Fellow (2006-2009)

Dissertation Advisor: Jeffrey M. Peters, Ph.D.

Dissertation: PPAR $\beta/\delta$  modulates AHR-dependent signaling and skin carcinogenesis.

#### **UNDERGRADUATE**

The Pennsylvania State University, University Park Campus

May 2005

B.S. in Biochemistry and Molecular Biology, Cum Laude, Schreyer Honors Scholar

### **RESEARCH**

My research focuses on characterizing the biochemical functions of the nuclear hormone receptor peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) and PPAR $\gamma$  in models of human skin and cancers, including carcinoma and melanoma. These studies focus on dissecting the receptor- and ligand-dependent functions of PPAR $\beta/\delta$  and PPAR $\gamma$  in epithelial genomic and epigenomic transcriptional regulation, cell proliferation, apoptosis, and carcinogenesis with the hope of utilizing these receptors as chemopreventatives or chemotherapeutics against human skin diseases.

### **TEACHING/MENTORING EXPERIENCE**

Instructor, BU

2011 -

Chemistry 101 – Introductory Chemistry (Lecturer)

Chemistry 108 – Physiological Chemistry (Laboratory Instructor)

Chemistry 115 – Chemistry for the Sciences I (Laboratory Instructor)

Chemistry 341 – Biochemistry I (Lecturer and Laboratory Instructor)

Chemistry 442 – Biochemistry II (Lecture and Laboratory Instructor)

Chemistry 492 – Chemical Research I (Research Mentor), 3 Students

Chemistry 493 – Chemical Research II (Research Mentor), 2 Students

Biology 390 – Biological Research I (Research Mentor), 1 Student

Biology 391 – Biological Research II (Research Mentor), 1 Student

Undergraduate Mentor, Society of Toxicology (SOT)	2010 - 2011
Teaching Certificate, PSU Graduate School	2009
Instructor, Teaching Assistant (TA) Training Seminar PSU, BMMB Department	2006 - 2007
Teaching Assistant – PSU BMMB Department Laboratory in Molecular Genetics I (BMB 445W) – Spring 2006 Laboratory in Molecular Genetics II (BMB 446) – Fall 2006	2006

### **AWARDS/FELLOWSHIPS**

2 <sup>nd</sup> Place Student Abstract, <i>In Vitro</i> and Alternative Methods Specialty Section, SOT	2011
Outstanding Student Leadership Award, SOT	2011
Paper of the Year (Borland, et al. 2008, <i>Mol. Pharm.</i> ), Dermal Toxicology Specialty Section (DTSS), SOT	2010
1 <sup>st</sup> Place Student Abstract, Carcinogenesis Specialty Section (CSS), SOT	2009
1 <sup>st</sup> Place Student Abstract, DTSS, SOT	2008
NSF Graduate Research Fellowship	2006 - 2009
Honorable Mention – Althouse Outstanding TA Award, PSU	2006
Braddock and Roberts Fellowship, PSU	2005 - 2007
Arthur K. Anderson Memorial Scholarship, PSU	2004

### **Grants**

BU Faculty Research and Scholarship Grant, “Modulation of melanoma apoptosis and cytokine secretion by PPARs”.	2013 – 2014
Equipment Fund Request, Beckman Coulter Counter, BU Research Office	2011
Department Start-Up Funds, Chemistry and Biochemistry Department, BU	2011
Grant Award, PSU College of Agricultural Science Competitive Student Grant Program	2009
Grant Award, Battelle Student Research Grant, DTSS, SOT	2009

### **LEADERSHIP/SERVICE**

Grant Reviewer, PA State System of Higher Education (PASSHE) Faculty Professional Development Committee	2014 -
Science, Technology, Engineering and Mathematics (STEM) Innovations Team, College of Science and Technology (COST), BU	2013 -
Founding Editor and Reviewer, <i>Journal of Toxicological Education</i>	2013 -
Textbook Review, “Biochemistry Lab Manual”, Versita Publishing Group	2013 -

Elected Member, Membership Committee, Association of Pennsylvania State College & University Faculties (APSCUF)	2013 -
Alternate Delegate to State Legislative Assembly, APSCUF	2013 -
Member, Undergraduate Research Scholarship and Creative Activities (URSCA) Awards Committee, BU	2013 -
Member, Jessica Kozloff Scholarship Awards Committee, BU	2013 -
Member, Health Sciences Symposium Organization Committee, BU	2012 -
Reviewer, <i>Behavioral and Brain Functions</i> . Impact Factor: 2.13	2012 -
Webmaster, Chemistry and Biochemistry Dept., BU	2011 -
Member, Chemistry and Biochemistry Search and Screen Committee, BU	2011 -
Member, Chemistry and Biochemistry Curriculum Committee, BU	2011 -
Session Chair, "Mechanisms of Inflammation in Skin Carcinogenesis", 2011 SOT Annual Meeting.	2011
Reviewer, <i>Toxicological Sciences</i> . Impact Factor: 4.652	2010 -
Secretary, SOT Specialty Section Graduate Committee	2010 - 2011
Student Representative, CSS, SOT	2009 - 2011
Student Representative, DTSS, SOT	2008 - 2009

### **PUBLICATIONS** (Undergraduate students underlined)

**Borland M.G.**, Krishnan, P., Lee, C., Albrecht, P.P., Shan, W., Bility, M.T., Marcus, C.B., Lin, J.M., Amin, S., Gonzalez, F.J., Perdeu, G.H., and Peters, J.M. Modulation of aryl hydrocarbon receptor (AHR) signaling pathways by peroxisome proliferator-activated receptor  $\beta/\delta$  (PPAR $\beta/\delta$ ) in keratinocytes. Accepted to *Carcinogenesis*.

**Borland, M.G.** Introducing toxicology into the biochemistry curricula: using cytochrome c (Cyt<sub>c</sub>) functionalities as a model. *Journal of Toxicological Education*. (2013). 1: 54-65. Invited submission for the journal's inaugural issue.

Trumbo, T.A., Schultz, E., **Borland, M.G.**, and Pugh, M.E. Applied Spectrophotometry: Analysis of a Biochemical Mixture. *Biochemistry and Molecular Biology Education*. (2013). 41(4): 242-250. PMID: 23625877.

Khozoie, C., **Borland, M.G.**, Zhu, B., Baek, S., John, S., Hager, G.L., Shah, Y.M., Gonzalez, F.J., and Peters, J.M. Analysis of the peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) cistrome reveals novel co-regulatory role of ATF4. *BMC Genomics* (2012). 13(665). PMID: 23176727.

**Borland, M.G.**, Khozoie, C., Albrecht, P.P., Lee, C., Lahoti, T.S., Zhu, B., Gonzalez, F.J., and Peters, J.M. Stable over-expression of PPAR $\beta/\delta$  and PPAR $\gamma$  to examine receptor signaling in human HaCaT keratinocytes. *Cellular Signaling* (2011). 23(12): 2039-2050. PMID: 21843636.

Foreman, J.E., Chang, W., Palkar, P.S., Zhu, B., **Borland, M.G.**, Williams, J.L., Clapper, M.L., Gonzalez, F.J., and Peters, J.M. Functional characterization of peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) expression in colon cancer. *Molecular Carcinogenesis* (2011). 50(11): 884-900. PMCID: 21400612.

Daoudi, M., Hennuyer, N., **Borland M.G.**, Duhem, C., Gross, B., Peters, J.M., Staels, B., and Lestavel, S. PPAR $\beta/\delta$  activation induces enteroendocrine L cell GLP-1 production. *Gastroenterology* (2011). 140(5): 1564-74. PMCID: 21300064

Palkar, P.S., **Borland M.G.**, Naruhn, N., Ferry, C.H., Lee, C., Uh, S.K., Sharma, A.K., Sk, U.H., Amin, S., Murray, I.A., Anderson, C.R., Perdew, G.H., Gonzalez, F.J., Muller, R., and Peters, J.M. Cellular and pharmacological selectivity of the PPAR $\beta/\delta$  antagonist GSK3787. *Molecular Pharmacology* (2010). 78(3): 419-430. PMCID: 20516370.

Genovese, S., Foreman, J.E., **Borland, M.G.**, Epifano, F., Gonzalez, F.J., Curini, M., and Peters, J.M. A natural propenoic acid derivative activates peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ). *Life Sciences* (2010). 86(13-14): 493-498. PMCID: 20153754.

He, P., **Borland, M.G.**, Zhu, B., Sharma, A.K., Amin, S.M., El-Bayoumy, K., Gonzalez, F.J., and Peters, J.M. Effect of ligand activation of peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) in human lung cancer cell lines. *Toxicology* (2008). 254(1-2): 112-117. PMCID: 18950674.

**Borland, M.G.**, Foreman, J.E., Girroir, E.E., Zolfaghari, R., Sharma, A.K., Amin, S.M., Gonzalez, F.J., Ross, A.C., and Peters, J.M. Ligand activation of peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) inhibits cell proliferation in human HaCaT keratinocytes. *Molecular Pharmacology* (2008). 74(5): 1429-1442. PMCID: 18687807.

Hollingshead, H.E., **Borland, M.G.**, Billin, A.N., Willson, T.M., Gonzalez, F.J., and Peters, J.M. Ligand activation of peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) and inhibition of cyclooxygenase-2 (COX2) attenuate colon carcinogenesis through independent signaling mechanisms. *Carcinogenesis* (2008) 29(1): 169-176. PMCID: 17893232.

Hollingshead, H.E., Killins, R.L., **Borland, M.G.**, Girroir, E.E., Billin, A.N., Willson, T.M., Sharma, A.K., Amin, S., Gonzalez, F.J., and Peters, J.M. Peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) ligands do not potentiate growth of human cancer cell lines. *Carcinogenesis* (2007). 28(12): 2641-2649. PMCID: 17693664.

## **POSTER/PLATFORM PRESENTATIONS** (Undergraduate students underlined)

Gray, J.P, Blase, B., **Borland, M.G.**, Ford, S.M., Gallo, M.A., Hall, G., Ray, S.D., Reynolds, M., Slitt, A.L., Williams, L.M., and Zamule, S.M. The Journal of Toxicological Education (JTOXED) – A milestone in toxicology education. *The Toxicologist*. 138(1): Pg. 290, Abstract 1679. Poster at the 2014 SOT Annual Meeting.

**Borland, M.G.**, Ola, E., Pritzlaff, A.M., Albrecht, P.P., Lahoti, T.S., Gonzalez, F.J., and Peters, J.M. Modulation of human melanoma cell line proliferation by PPAR $\beta/\delta$  and PPAR $\gamma$ . *The Toxicologist*. 138(1): Pg. 153, Abstract 260. Poster at the 2014 SOT Annual Meeting.

**Borland, M.G.** Delineating the Functions of Peroxisome Proliferator-Activated Receptors (PPARs) in Human Skin and Cancer Models. Platform Presentation at the "Fourth Annual

Disappearing Boundaries Summer Research Meeting”, Lebanon Valley College (Annville, PA). July 17, 2013.

Yao, P., **Borland, M.G.**, Krishnan, P., Zhu, B., Gonzalez, F.J., and Peters, J.M. Inhibition of clonogenicity and xenograft tumor growth by activation of peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ). *American Association for Cancer Research Meeting Program*. Pg. 299, Abstract 1295. Poster at the 2013 AACR Annual Meeting.

**Borland, M.G.**, Foreman, J.E., Lee, C., Kramer, L.R., Albrecht, P.P., Zhu, Lahoti, T.S, Gonzalez, F.J., and Peters, J.M. Ligand- and receptor-dependent effects of PPAR $\beta/\delta$  and PPAR $\gamma$  on cell proliferation in the A431 carcinoma cell line. *The Toxicologist*. 126(1): Pg. 142, Abstract 174. Poster at the 2012 SOT Annual Meeting.

Albrecht, P.P., Balandaram, G.V., Ferry, C.H., **Borland, M.G.**, Zhu, B., Gonzalez, F.J., and Peters, J.M. Effect of stable over-expression of PPAR $\beta/\delta$  in Huh7 cells. *The Toxicologist*. 126(1): Pg. 304, Abstract 2001. Poster at the 2012 SOT Annual Meeting.

Palkar, P.S., **Borland, M.G.**, Khozoie, C., Zhu, B., Lee, C., Gonzalez, F.J., and Peters, J.M. Stable over-expression of PPAR $\beta/\delta$  and PPAR $\gamma$  to examine receptor signaling in human HaCaT keratinocytes. *The Toxicologist*. 120(1): Pg. 145, Abstract 354. Poster at the 2011 SOT annual meeting.

Morales, J.L., **Borland, M.G.**, Lee, C., Gonzalez, F.J., and Peters, J.M. PPAR $\beta/\delta$  modulates AHR signaling in mouse and human keratinocytes. *The Toxicologist*. 120(1): Pg. 145, Abstract 355. Poster at the 2011 SOT annual meeting.

Khozoie, C., **Borland, M.G.**, Zhu, B., Gonzalez, F.J., and Peters, J.M. Characterization of genome-wide peroxisome proliferator-activated receptor- $\beta/\delta$  (PPAR $\beta/\delta$ ) binding and transcriptional regulation. *The Toxicologist*. 120(1): Pg. 145, Abstract 358. Poster at the 2011 SOT annual meeting.

Lestavel, S., Daoudi, M., Hennuyer, N., **Borland, M.G.**, Peters, J.M., and Staels, B. PPAR $\beta/\delta$  positively regulates GLP-1 production by intestinal endocrine L cells and improves the oral glucose-induced insulin secretion in diabetic ob/ob mice. Poster at the 2010 European Association for the Study of Diabetes (EASD) meeting.

Palkar, P.S., **Borland M.G.**, Lee, C., Ferry, C.H., Sharma, A.K., Amin, S., Billin, A.N., Willson, T.M., Gonzalez, F.J., and Peters, J.M. PPAR $\beta/\delta$ -dependent and independent functions of the PPAR $\beta/\delta$  antagonist GSK3787. *The Toxicologist*. 114(1): Pg. 456, Abstract 2143. Poster at the 2010 SOT annual meeting.

**Borland, M.G.**, Bility, M.T., Gonzalez, F.J., Perdew, G.H., and Peters, J.M. PPAR $\beta/\delta$  regulates AhR signaling in skin. *The Toxicologist*. 108(1): Pg. 186, Abstract 900. Poster at the 2009 SOT annual meeting.

**Borland, M.G.**, Girroir, E.E., Billin, A.N., Willson, T.M., and Peters, J.M. Ligand activation of PPAR $\beta/\delta$  inhibits proliferation in human HaCaT keratinocytes. *The Toxicologist*. 102(1): Pg. 318, Abstract 1549. Poster at the 2008 SOT annual meeting.

**Borland, M.G.**, Bility, M.T., Lin, J.-M, Desai, D., Amin, S., Perdew, G.H., and Peters, J.M. Modulation of AhR-dependent signaling by PPAR $\beta/\delta$ . *The Toxicologist*. 96(1): Pg. 155, Abstract 754. Poster at the 2007 SOT annual meeting.

## **STUDENT PRESENTATIONS** (Undergraduate students underlined)

Wagner, A.L. and **Borland, M.G.** Examining PPAR-dependent modulation of apoptosis and cytokine secretion in human malignant melanoma. Spring 2014 BU COST Research Day. May 2, 2014. Platform Presentation.

Shannon, B.E. and **Borland, M.G.** Examining the effects of PPAR expression on Vitamin D-based melanoma therapeutics. Spring 2014 BU COST Research Day. May 2, 2014. Platform Presentation.

Wagner, A.L. and **Borland, M.G.** Examining the effects of PPAR expression on glucocorticoid-based melanoma therapeutics. Fall 2013 BU College of Science & Technology (COST) Research Day. December 13, 2013. Platform Presentation.

Rahner, E.F. and **Borland, M.G.** Correlating mono-unsaturated fatty acid chain length to PPAR-dependent anti-proliferative effects in malignant melanoma. National Collegiate Honors Council meeting. November 2013. Accepted poster abstract.

Rahner, E.F. and **Borland, M.G.** Examining palmitoleic acid as a natural PPAR ligand and melanoma therapeutic. Spring 2013 BU COST Research Day. May 11, 2013. Platform Presentation.

Ola, E. and **Borland, M.G.** Defining the receptor- and ligand-dependent functions of PPAR $\beta/\delta$  on cell proliferation and metastasis in human malignant melanoma. Spring 2013 BU COST Research Day. May 11, 2013. Platform Presentation.

Pritzlaff, A.M. and **Borland, M.G.** Defining the receptor- and ligand-dependent functions of PPAR $\gamma$  on cell proliferation and metastasis in human malignant melanoma. Fall 2012 BU COST Research Day. May 11, 2013. Platform Presentation.

## **STUDENT FUNDED PROPOSALS**

B.E. Shannon, "Examining Vitamin D and PPAR ligands as combined melanoma therapeutics". Kozloff Research Grant 2014

E.F. Rahner, "Correlating mono-unsaturated fatty acid chain length to PPAR-dependent anti-proliferative effects in malignant melanoma, URSCA 2013

## **PROFESSIONAL MEMBERSHIPS**

American Chemical Society (2011 - )

American Society for Biochemistry and Molecular Biology (2014 - )

APSCUF (2011 - )

Society of Toxicology (2006 - )