

Michael August Menze

Assistant Professor

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Education

- 2001 Dr. rer. nat. Heinrich-Heine-University, Düsseldorf, Germany, and Johannes-Gutenberg-University Mainz, Germany.
- 1997 Dipl. Biol. Heinrich-Heine-University, Düsseldorf, Germany
Major: Zoology (Physiology). Minors: Biochemistry, Organic Chemistry.

Professional Experience

- 2010 - present Assistant Professor, Department of Biological Sciences, Eastern Illinois University, Charleston, IL.
- 2010 - present Gratis Appointment Assistant Professor - Research, Department of Biological Sciences, Louisiana State University, Baton Rouge, LA.
- 2006 - present Visiting Scientist Appointment, Center for Engineering in Medicine, Shriners Burns Hospital and Massachusetts General Hospital, Harvard Medical School, Boston, MA.
- 2006 - 2010 Assistant Professor - Research, Department of Biological Sciences, Louisiana State University, Baton Rouge, LA.
- 2001 - 2006 Postdoctoral Researcher, Department of Biological Sciences, Louisiana State University, Baton Rouge, LA.

Awards

- Provost's Undergraduate Research Mentor Award, *EIU* (2014).
- College of Sciences Lida G. Wall Faculty Research Mentor and Teacher Award, *EIU* (2013).
- Achievement and Contribution Award (ACA - Research), *EIU* (2013).
- College of Sciences Student Advisory Board Outstanding Faculty Award, *EIU* (2012).
- Achievement and Contribution Award (ACA - Research), *EIU* (2011).
- Deans Award of Excellence in Research and Creative Activity, *EIU*, 2011.
- Deans Award of Excellence in Research and Creative Activity, *EIU*, 2010.

Grants

- BioCision, LLC. Improving Cell Monolayer Freezing (2014). Amount awarded: \$2000.
- Redden Fund Grant Award (2014), *EIU*, (Michael Menze, PI). Amount awarded: \$1250.
- Council on Faculty Research Grant (CFR) Award, *EIU*, "Trehalose - the Sweet Way to Preserve Cells and Tissues" (10/2013-7/2014; Michael Menze, PI). To investigate the role of trehalose on cryopreservation of hepatocyte monolayers. Amount awarded: \$4,705.
- Redden Fund Grant Award (2013), *EIU*, (Michael Menze, PI). Amount awarded: \$1050.
- NSF grant "Mechanisms of Animal Desiccation Tolerance" (09/2011 - 09/2013; Steven Hand, PI, and Michael Menze, Co-PI; IOS-0920254). Amount awarded: \$17,610.
- Council on Faculty Research Grant (CFR) Award, *EIU*, "Mitochondrial Dysfunctions in Type 2 Diabetes" (7/2013-8/2013; Michael Menze, PI). To investigate the role of mitochondrial bioenergetics in the development of insulin insensitivity. Amount awarded: \$4,500.
- Interdisciplinary Research in the Sciences Grant (IRIS), *EIU*, "Targeting type-2 diabetes" (12/2012 - 06/2013; Mary Konkle, PI, Michael Menze, PI). Amount awarded: \$5,000.
- Redden Fund Grant Award (2012), *EIU*, (Michael Menze, PI). Amount awarded: \$750.
- President's Initiative Found (PIF) Award, *EIU*, "Role of Estrogen in Alzheimer's Disease" (2012 - 2013; Michael Menze, PI, Britto Nathan, Co-PI). To investigate the role of the female sex hormone estrogen on mitochondrial bioenergetics. Amount awarded: \$16,780.

- Interdisciplinary Research in the Sciences Grant (IRIS), *EIU*, “Untangling Alzheimer’s Disease: Identifying Mitochondrial Protein Targets of Oxidative Stress” (12/2011 – 06/2012; Mary Konkle, PI, Michael Menze, PI, Britto Nathan, PI). Amount awarded: \$4,000.
- Redden Fund Grant Award (2011), *EIU*, (Michael Menze, PI). Amount awarded: \$1,500.
- Proposal Initiative Fund (PIF) Award, *EIU*, “Using Inquiry-based Learning Modules to Vertically Integrate Core Biological Concepts in the Biology Majors Curriculum” (08/2011-08/2012; Michael Menze, PI, Gary Bulla, PI, Robert Colombo, PI, Karen Gaines, PI, Kai Hung, PI, James Novak, PI). Amount awarded: \$7,500.
- Council on Faculty Research Grant (CFR) Award, *EIU*, “Sex and Power – the Role of Estrogen in Alzheimer’s Disease” (7/2011-8/2011; Michael Menze, PI, Britto Nathan, PI). To investigate the role of the female sex hormone estrogen on mitochondrial bioenergetics. Amount awarded: \$4,500.
- Council on Faculty Research grant (CFR), *EIU*, “Life without Water” (10/2010-10/2011; Michael Menze, PI). Total Amount awarded: \$4,000. To investigate the role of trehalose transporters in stabilization of insect cells.

Grants (pending)

- NSF Proposal: ‘Collaborative research: Mechanisms of Tolerance to Severe Water Stress in Animals’. Amount requested: \$192,637.
- NIH Proposal: Role of mitoNEET in brain energy homeostasis”. Amount requested: \$333,401.

Publications (selected)

- Stokich* B., Osgood* Q., Grimm* D., Moorthy* S., Chakraborty N., and **Menze M.A.** (2014). Cryopreservation of hepatocyte (HepG2) cell monolayers: impact of trehalose. *Cryobiology*, *in press*.
- Boswell L., **Menze M.A.**, and Hand S.C. (2014). Group 3 LEA proteins from embryos of *Artemia franciscana*: structural properties and protective abilities during desiccation. *Physiol. Biochem. Zool.*, *in press*.
- Paudel* S., and **Menze M.A.** (2014). Genetic engineering for sustainable biofuel production: a review. *Int. J. Env.* 3(2):324-344.
- Roberts* M.A., Crail* J.P., Laffoon* M.M., Fernandez* W., **Menze M.A.**, and Konkle M.E. (2013). Disulfide bond with glutamate dehydrogenase 1 links diabetes drug target mitoNEET to cellular metabolism. *Biochemistry* 52 (50): 8969-8971.
- Martinez* E., **Menze M.A.**, and Torres J.J. (2013). Mitochondrial energetics of benthic and pelagic Antarctic teleosts. *Mar. Biol.* 160: 2813-2823.
- Marunde* M.A., Samarajeewa* D.A., Anderson* J., Li S., Hand S.C., and **Menze M.A.** (2013). Improved tolerance to salt and water stress in *Drosophila melanogaster* cells conferred by late embryogenesis abundant protein. *J. Insect Physiol.* 59(4):377-86.
- Borcar* A., **Menze M.A.**, Toner M., Hand S.C. (2013). Metabolic preconditioning of mammalian cells: mimetic agents for hypoxia lack fidelity in promoting phosphorylation of pyruvate dehydrogenase. *Cell Tissue Res.*, 351 (1): 99-106.
- Li S, Chakraborty N, Borcar* A, **Menze MA**, Toner M, Hand SC. (2012). Late embryogenesis abundant proteins protect human hepatoma cells during acute desiccation. *Proc. Natl. Acad. Sci. U. S. A.* 109 (51): 20859-64.
- Pobrabsky J.E., **Menze M.A.**, and Hand S.C. (2012). Long-term survival of anoxia despite rapid ATP decline in embryos of the annual killifish *Austrofundulus limnaeus*. *J. Exp. Zool.* 317 (8):524-32.
- Chakraborty N., **Menze M.A.**, Heidi Elmoazzen H., Vu* H., Yarmush M.L., Hand S.C., and Toner M. (2012). Trehalose transporter from African chironomid improves desiccation tolerance of Chinese Hamster Ovary cells. *Cryobiology* 64(2):91-6.
- Chakraborty N., **Menze M.A.**, Malsam* J., Aksan A., Hand S.C., and Toner M. (2011). Cryopreservation of spin-dried mammalian cells, *PLOS* 6 (9):e24916.

- Hand S.C., **Menze M.A.**, Borcar* A., Patil* Y., Covi* J.A., Reynolds* J. A., and Toner M. (2011). Metabolic Restructuring during Energy-Limited States: Insights from *Artemia franciscana* embryos and other animals. *Journal of Insect Physiology*, 57(5):584-94.
- Chang A., Chakraborty N., Elmoazzen H., **Menze M.A.**, Hand S.C., and Toner M. (2011). Spinning technique for lyopreservation of mammalian cells, *Annals of Biomedical Engineering* 39(5):1582-91.
- Hand S.C., **Menze M.A.**, Toner M, Boswell L., and Moore D. (2011). Expression of LEA proteins during water stress: not just for plants anymore. *Annu. Rev. Physiol.*, 17 (73):115-34.
- Menze M.A.**, Banerjee M., Clavenna M., Liu X.H., Toner M. and Hand S.C. (2010). Metabolic preconditioning of cells with AICAR-riboside: improved cryopreservation and cell-type specific impacts on energetics and proliferation. *Cryobiology* (61): 79-88.
- Menze M.A.**, Fortner* G., Naq* S., and Hand S.C. (2010). Mechanisms of apoptosis in Crustacea: what conditions induce versus suppress cell death? *Apoptosis* 15 (3): 293-313.
- Menze M.A.**, and Hand S.C. (2009). How do animal mitochondria tolerate water stress? *Commun. Integr. Biol.* 2 (5): 428-430.
- ***Menze M.A.**, Boswell L., Toner M. and Hand S.C. (2009). Occurrence of mitochondrial-targeted late embryogenesis abundant (LEA) gene in animals increases organelle resistance to water stress. *J. Biol. Chem.* 284 (16): 10714-10719.
- Bauer A., **Menze M.A.**, and Grieshaber M.K. (2009). Thermodynamics of effector binding to hemocyanin: influence of temperature. *Arch. Biochem. Biophys.* 483 (1): 37-44.
- He X., Fowler A., **Menze M.A.**, Hand S.C. and Toner M. (2008). Desiccation kinetics and bi-thermodynamics of glass forming trehalose solutions in thin films. *Ann. Biomed. Eng.* 36: 1428-39.
- Hand S.C. and **Menze M.A.** (2008). Preservation of cells using reversible pore formation. United States Patent 7314755.
- Hand S.C. and **Menze M.A.** (2008). Mitochondria under energy-limited states: mechanism that blunt the signaling of cell death. *J. Exp. Biol.* 211: 1829-1840.
- Menze M.A.** and Hand S.C. (2007). Caspase activity during cell stasis: avoidance of apoptosis in an invertebrate extremophile, *Artemia franciscana*. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 292: R2039-R2047.
- Menze M.A.** Perspectives in Zoophysiology. In: Höhepunkte der Zoologischen Forschung, edited by Waegele J.W., Basiliken-Press, Marburg, 2007, pp. 243-249.
- Hand S.C. and **Menze M.A.** Desiccation stress. In: Encyclopedia of tide pools and rocky shores, edited by Denny M.W. and Gaines S.D., University of California Press, Berkeley, 2007, pp. 173-177.
- Hand S.C, Jones D., **Menze M.A.** and Witt T.L. (2007). Life without water: expression of plant LEA genes by an anhydrobiotic arthropod. *J. Exp. Zool.* 307 (A): 62-66.
- Elliott G., Cusick J., Liu X.H., **Menze M.A.**, Vincent J., Witt T., Hand S. and Toner M. (2006). Trehalose uptake through P2X₇ purinergic channels provides desiccation protection. *Cryobiology* 52 (1): 114-127.
- Buchanan S.S., **Menze M.A.**, Hand S.C., Pyatt D.W. and Carpenter J. (2005). Cryopreservation of human hematopoietic stem and progenitor cells loaded with trehalose: transient permeabilization via the adenosine triphosphate-dependent P₂Z receptor channel. *Cell Preservation Technology* 3 (4): 212-222.
- Menze M.A.**, Hellmann N., Decker H. and Grieshaber M.K. (2005). Allosteric models for multimeric proteins: Oxygen-linked effector binding in hemocyanin. *Biochemistry* 44 (30): 10328-10338.
- Menze M.A.**, Hutchinson K., Laborde S.M. and Hand S.C. (2005). Mitochondrial permeability transition in the crustacean *Artemia franciscana*: Absence of a Ca²⁺-regulated pore in the face of profound calcium storage. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 289 (1): R68-R76.

Menze M.A., Clavenna M. and Hand S.C. (2005). Depression of cell metabolism and proliferation by membrane permeable and impermeable modulators: Role for AMP:ATP ratio. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* 288 (2): R501-R510.

*Student researcher, undergraduate students underlined.

Posters and Oral Papers (selected presentations - past 2 years)

Poznic* B., and **Menze M.A.** Impact of LEA proteins on osmotic stress tolerance of mammalian cells. Presented at the annual National Conferences on Undergraduate Research (NCUR). Lexington KY, 2014.

Grimm* D., Altamirano* L, Konkle M., and **Menze M.A.** Effects of pioglitazone on liver cell bioenergetics. Presented at the annual National Conferences on Undergraduate Research (NCUR). Lexington KY, 2014.

Hendricks* E., Nathan B., and **Menze M.A.** Estrogen treatment dramatically increases respiration in Alzheimer's disease model. Presented at the annual meeting of the American Society for the Advancement in Sciences (AAAS), Chicago, IL, 2014.

Stokich* B. and **Menze M.A.** Biomimetic approaches in cryopreservation. Presented at the annual meeting of the American Society for the Advancement in Sciences (AAAS), Chicago, IL, 2014.

Ferry* N., Laffoon* M.M., Konkle M., and **Menze M.A.** MitoNEET: reduction in insulin resistance through ameliorated oxidative stress? Presented at the annual meeting of the American Society for Cell Biology (ASCB), New Orleans, LA, 2013.

Menze M.A. Group I LEA protein ameliorates inhibition of mitochondrial respiration in *Drosophila* Kc167 cells. Presented at the annual Mitochondrial Physiology (MIP) meeting, Obergurgl, Austria, 2013.

Stokich* B., Schreyer B., Osgood* Q., Chakraborty N., Thompson M., and **Menze M.A.** Trehalose incubation improves cryopreservation of hepatoma cell monolayers. Presented at the annual meeting of the Biomedical Engineering Society (BMES), Seattle, WA, 2013.

Osgood* Q., Chakraborty N., Stokich* B., and **Menze M.A.** Novel protein acts as cryoprotectant for embryonic kidney cell monolayers. Presented at the annual meeting of the Biomedical Engineering Society (BMES), Seattle, WA, 2013.

Fernandez* W., Erbacher* L., Konkle M., and **Menze M.A.** Examining the role of estrogen and oxidative damage in Alzheimer's Disease. Council on Undergraduate Research (CUR) *Poster on the Hill event*: to highlight undergraduate research to U.S. Senators and Representatives on Capitol Hill. Washington, DC, 2013.

Martinez* E., **Menze M.A.**, and Torres J.J. Mitochondrial energetics of benthic and pelagic Antarctic teleosts. Presented at the annual meeting of the American Society of Limnology and Oceanography (ASLO). New Orleans, LA, 2013.

Tofte* A., Nathan B., and **Menze M.A.** Mitochondrial bioenergetics in response to estrogen therapy. Presented at the annual meeting of the Illinois State Academy of Science. Jacksonville, IL, 2013.

Ferry* N., Roland* F., Konkle M., and **Menze M.A.** Type-2 Diabetes: Does mitoNEET impact mitochondrial functions by multiple mechanisms? Presented at the annual National Conferences on Undergraduate Research (NCUR). La Crosse, WI, 2013.

Samarajeewa* D., Harder* A., Toner M., Chakraborty N., and **Menze M.A.** Intracellular ice nucleation protein reduces cryogenic injury in eukaryotic cells. Presented at the annual meeting of the Society for Integrative and Comparative Biology (SICB). San Francisco, CA, 2013.

*Student researcher, undergraduate students underlined.

Service and Outreach

Secretary for the local Sigma Xi chapter (2011 – present), Faculty Fellow for Carman Hall (2011 – present), Facilitator for the EIUreads! program (2011 – present), Faculty Mentor for the Jumpstart 2 G.I.V.E. program (2011 – present); Council of Graduate Studies (CGS) Committee, Chair (2014); Department Application of Criteria (DAC) Committee member (2012 – 14), Grants Committee chair (2011 – present), Graduate Committee member (2011 – present), Facilities Committee member (2010); Review Editor for *Frontiers in Aquatic Physiology* (2010 – present); Best Student Paper Judge at the Annual Meeting of the Society for Integrative and Comparative Biology (2009, 2011, 2012); Scientific Advisor for the Mitochondrial Physiology Society, MIPboard member (2009 – present).

Reviewer for Proposals

National Science Foundation (NSF). *Ad hoc* reviewer for the Physiological and Structural Systems Cluster (Integrative Organismal Systems) (2007, 2009, 2010).

Reviewer for Manuscripts

BBA Proteins and Proteomics (2006, 2008), Biochemistry (2009, 2010), Biochemistry and Cell Biology (2007, 2009), Biotechnology Progress (2005, 2008), BMC Developmental Biology (2005, 2008), Canadian Journal of Zoology (2013, 2014), Comparative Physiology and Biochemistry (2003, 2006, 2007, 2010), Cryobiology (2006, 2007, 2009, 2010), Genomics (2013), Journal of Aquatic Physiology (2011, 2012, 2014), Journal of Biological Chemistry (2011, 2012), Journal of Experimental Zoology (2009), NCUR Proceedings (2013), Thermochemica Acta (2005), The Plant Cell (2007).

Graduate Student Mentored

Swanith Rekulapally (2014 – present), Kazi Islam (2014 – present), Jacquelyn Crail (2014 – present), Trisha Baily (2013 – present), Sudip Paudel (2013 – present), Eric Hendricks (2012 – 14), Dilini Samarajeewa (2011– 13), Alyssa Walser (2011 – 13), Michael Hughes (2011 – 12), John Anderson (2010 – 12).

Undergraduate Research Students Mentored

Daniel Webster (2014 – present), Austin Wiegand (2014 – present), Robert Skolik (2013 – present), Amechi Alozie (2013 – present), David Constantinescu (2013 – present), Clinton Belott (2013 – present), Jocelyn Herrera (2013 – present), Leonardo Altamirano (2013 – present), David Grimm (2013 – present), Blake Stokich (2012 – present), Nicolas Ferry (2012 – 14), Kevin Stanley (2012 – present), Nicolas Ferry (2012 – present), Austin Tofte (2012), Ben Poznic (2012 – present), Christopher Phillips (2012 – present), Nathan Camp (2012), Minh Nguyen (2011 – present), Avril Harder (2011 – present), Haisma Tiffany (2011 – 12), Mitchell Cronk (2010 – 12), William Fernandez (2010 – present), Thiruni Adikari (2010 – 12), Matthew Marunde (2010 – present), Jena Slaughter (2010 – 12), Ujwal Jain (2010 – 11), Kiara Mack (2010 – 11).

Undergraduate Research, Scholarship, and Creative Activities (URSCA) Awards

Robert Skolik (2014), David Constantinescu (2014), Clinton Belott (2013), Ben Poznic (2013), Nicolas Ferry (2013), Blake Stokich (2013), William Fernandez (2012), Nathan Camp (2012), Matthew Marunde (2012), Matthew Marunde (2011), William Fernandez (2011).

SURE and GSI Awards - EIU College of Sciences

Ben Poznic (2014), Nicolas Ferry (2014), Blake Stokich (2014), Erick Hendricks (2014), Sudip Paudel (2014), Matthew Marunde (2013), William Fernandez (2013), Erick Hendricks (2013), Dilini Samarajeewa (2013), Matthew Marunde (2012), John Anderson (2011), William Fernandez (2012).