

Continuous Professional Development (CPD) Grant Application

Name William Jaeckle

Department or School Department of Biology

Brief Description of Training Opportunity: Enroll and complete BSC 411 (Confocal Microscopy in Biology) at Illinois State University (fall semester, 2021)

Amount Requested \$857.18 Your Email: wjaeckle@iwu.edu

Is this your first CPD grant application? Yes No

If no, in what year was your most recent CPD grant awarded? _____

If your proposal is funded, would you be willing for the Mellon Center to use it as an exemplary submission in the online *Handbook*? Yes No

Please complete the following checklist by placing a check mark against each item to ensure that your application is complete. Incomplete applications will be returned to the applicant without further consideration.

- 1. Summary of Prior CPD grants (if relevant)
- 2. Narrative (as per format described in *Handbook*)
- 3. CPD Budget Page
- 4. Copy of Brief CV

Signature Will Jaeckle Date 7 August 2021

2. Summary of Previous CPD Grants

Non applicable. I have received no previous CPD grants.

3. Narrative

A. Training Opportunity. Describe the training opportunity.

I am requesting funds to pay fees related to my admission and course fees for a course (BSC 411, Confocal Microscopy in Biology) that I will complete at Illinois State University (ISU) during the fall (2021) semester.

Scanning confocal laser microscopy (SCLM) is powerful microscopy method that allows a specimen to be “optically sliced” into a series of individual sections (images) that are captured free from light produced by material above or below each successive plane of section. The resulting “stack” of individual sections can then be combined to provide remarkable clarity about the specimen’s anatomy. Specific components within a specimen can be differentially labelled using different fluorescent tags and visualized using SCLM. The combination of advances in stain technology and SCLM allows the form and function of organisms (Figure 1) to be carefully studied.



Figure 1: (A) Field-collected pentactula-stage larva of a sea cucumber (Echinodermata: Holothuroidea) from the Florida Current of the Gulf Stream. Muscle fibers in the body wall and the anterior tentacles are stained red (phalloidin), cyan-colored ovals represent nuclei (stained with propidium iodide) within cells, and the yellow fibers (tubulin) represent the locomotory ciliary bands of this specimen. (B) Preoral lobe of a field-collected feeding bipinnaria larva of a sea star (Echinodermata: Asteroidea). The left and right coelomic cavities fuse within the preoral lobe; muscle cells (red fibers) surrounding the esophagus control movement of materials to the stomach (not visible). Images by W. Jaeckle and M. Boyle (Smithsonian Institution).

ISU has a state-of-the art scanning confocal laser microscope (Leica SP8). Through this course (BSC 411) I will have an ideal opportunity to learn about (1) new advancements in SLCM and (2) new computation methods for image analysis. More importantly, I will learn to how to use ISU's confocal microscope [the Advanced Bioimaging Facility at ISU is available for use by "users from throughout the Midwest region."].

B. Professional Development. Describe how the learning goals/skills relate to the applicant's artistic, scholarly, or pedagogical development.

I have some experience using a different confocal microscopy instrument at the Smithsonian Marine Station in Fort Pierce, Florida (*e.g.*, Figure 1), but travel restrictions resulting from COVID-19 pandemic makes future access to this instrument difficult to predict and, in the near future, I would prefer to avoid travel to Florida.

My research plan for the next two or more years include use of confocal microscopy to study the anatomy and physiology of small planktonic invertebrate animals called rotifers. Training in the use of the instrument at ISU allows opportunities for research projects that are currently not possible; examples of future projects supported by SLCM are listed in Table 1. Also, my training on the use of the Leica SP8 will allow the types of projects that my IWU research students can complete to significantly increase (and provide them a practical introduction to SCLM). **Note:** the completion of this course provided me with the tools necessary to complete future research projects and **does not** contribute to an ongoing research project.

I am eligible for a sabbatical leave during the 2022-2023 academic year and my sabbatical research project, if approved, will require use of the SCLM at ISU.

Table 1: Examples of research projects the require confocal scanning laser microscopy.

1. Identification of the site(s) of absorption of plastic nanoparticles by freshwater and marine rotifers.
2. How and through which pathways are materials transported from the female body to the developing offspring in the oviparous rotifers (*e.g.*, species that deposit "eggs" from which the juvenile emerges)?
3. How and through which pathways are materials transported from the female body to the developing offspring in the viviparous rotifers (*e.g.*, species where a juvenile completes development within the body cavity of the adult female and is released as a fully-formed juvenile.)?

C. Proposed Expenses. Provide a justification for expenses that corresponds to items requested on the application budget page.

The only support I seek will reimburse me for the costs of applying to ISU "Admission fee" and the course fee for BSC 411. Any shortfall in support would be supplied by personal funds.

Admission fee	\$ 50.00
Course fee (2 credit hours × \$403.59 / credit hour)	<u>\$807.18</u>
	\$857.18

D. Proposed Timetable. Include a timetable for completion (especially if there is a series of seminars or workshops).

BSC 411 is a 2 credit-hour course which meets each Friday from 1-1:50 PM (lecture) and 2-2:50 PM (laboratory-1). A second laboratory period will be individually scheduled for different times during the week. My teaching responsibilities at IWU end on Friday at 9:55 AM and I am available for the other laboratory session on Tuesday and Thursday mornings from 9:30 – 12. Thus taking this course at ISU **does not** conflict with my teaching responsibilities at IWU.

Continuous Professional Development (CPD) Grant Budget Page

Faculty Name William Jaeckle

A. Course/Training Fees (please itemize) \$ 857.18

Admission fee - \$50.00

2 credit hour x \$403.59 / credit hour = \$807.18

B. Training Materials (please itemize) \$ 0.00

C. Travel (please itemize) \$ 0.00

D. Housing/Living Expenses (please itemize) \$ 0.00

E. Other (please itemize)

TOTAL (Maximum award \$1,000) \$ 857.18

Curriculum Vitae (CPD proposal)**William Bruce Jaeckle**

Department of Biology
 Illinois Wesleyan University
 P.O. Box 2900
 Bloomington, IL 61702-2900
 309-556-1063 (phone), email: wjaeckle@iwu.edu

Education

- 1982-1989. University of Southern California, Los Angeles, CA, Ph.D. Biology (1989), Title of Dissertation: *Growth, energetics, and nutrition of marine invertebrate larvae*; Advisor: Dr. Donal T. Manahan.
 1979-1981. Humboldt State University, Arcata, CA, Degree Awarded: B.A. Zoology (1981).
 1976-1978. College of Marin, Kentfield, CA, undergraduate program.

Academic Positions

- 2019 Semour and Galina Endowed Professor of Biology
 2015 Professor of Biology, Illinois Wesleyan University (IWU)
 2013 Instructor, Smithsonian Tropical Research Institute, Bocas del Toro laboratory
 2006- Associate Professor of Biology, IWU
 2004 Summer Instructor, University of Oregon
 2001-05 Assistant Professor of Biology, IWU

Publication Record (since 2010)**Articles and Chapters:**

- Pappalardo, P., A.G. Collins, K.M. Pagenkopp Lohan, K.M. Hanson, S.B. Truskey, **W. Jaeckle**, C.L. Ames, J.A Goodheart, S.L. Bush, L.M. Biancani, E.E. Strong, M. Vecchione, M.G. Harasewych, K. Reed, C. Lin, E.C. Hartil, J. Whelpley, J. Blumberg¹, K. Matterson, N.E Redmond, A. Becker, M.J. Boyle, K.J. Osborn. 2021. The role of taxonomic expertise in interpretation of metabarcoding studies, *ICES Journal of Marine Science*. fsab082, <https://doi.org/10.1093/icesjms/fsab082>
- Jaeckle, W.B., M.J. Boyle, M. Komatsu (contracted, Sept. 2021). Phylum Echinodermata: Asterozoa (In:) *Atlas of Marine Invertebrate Larvae*, 2nd edition. Boyle, M.J., C.M. Young, and M. Sewell (eds.). (Elsevier).
- Boyle, M.J. and **W.B. Jaeckle** (contracted, Sept. 2021). Phylum Sipuncula (In:) *Atlas of Marine Invertebrate Larvae*, 2nd edition. Boyle, M.J., C.M. Young, and M. Sewell (eds.). (Elsevier).

William Jaeckle – C.V.

- Jaeckle, W. 2018. Chapter 9: Physiology of Larval Feeding. (In:) *Evolutionary Ecology of Marine Invertebrate Larvae*. Carriker, T., A.M. Reitzel, and A. Heyland (eds.). Oxford University Press. pp. 124-141.
- Allen, J.D., A.M. Reitzel, and **W. Jaeckle**. 2018. Chapter 5: Asexual Reproduction of Marine Invertebrate Embryos and Larvae. (In:) *Evolutionary Ecology of Marine Invertebrate Larvae*. Carriker, T., A.M. Reitzel, and A. Heyland (eds.). Oxford University Press. pp. 67-81.
- Bowers, E.K., A. White¹, A. Lang¹, L. Podgorski¹, C.F. Thompson, S.K. Sakaluk, **W.B. Jaeckle** and R.G. Harper. 2015. Eggshell porosity is unrelated to incubation onset and egg-laying order in clutches of House Wrens. *The Canadian Journal of Zoology* 93:421-425.
- Murphy, J.¹, M. Swanson¹, R.G. Harper, and **W.B. Jaeckle**. 2015. Corrosion casts: A novel application of a polyurethane resin (PU4ii) for visualizing eggshell pore morphology. *The Auk* 132(1): 206-211.
- Jaeckle, W.B. and R.R. Strathmann. 2013. The anus as a second mouth: Anal suspension feeding by an oral deposit-feeding sea cucumber. *Invertebrate Biology* 32: 62-68.
- Jaeckle, W.B., M. Kiefer¹, B. Childs¹, R.G. Harper, J. W. Rivers and B.D. Peer 2012. Comparison of eggshell porosity and estimated gas flux between the brown-headed cowbird and two common hosts. *J. Avian Biology* 43: 1-5.

Presentations at Professional Meetings and Abstracts (since 2012)

- Straznickas, B.¹ and **W.B. Jaeckle**. 2017. Feeding on the unseen: Ingestion and assimilation of bacteriophages by *Brachionus plicatilis* (Rotifera). *Integrative Biology* 57(1): E163.
- Jaeckle, W.B. and B. Pernet 2014. Can the feeding larvae of marine invertebrates capture bacteria-sized particles by drinking? *Integrative Biology* 54(1): E291.
- Swanson, M.T.¹, J.P. Murphy¹, **W.B. Jaeckle** and R.G. Harper. 2013. Corrosion casts: a novel application of Pu4ii resin for visualizing eggshell pore morphology. American Ornithological Society/Cooper Ornithological Society (AOU/COS) meeting.
- Takushi, S.¹ and **W.B. Jaeckle**. 2013. A modified method to measure gas exchange through pores in eggshell fragments. AOU/COS meeting.
- White, A.¹, L. Podgorski¹, E.K. Bowers, C.F. Thompson, S.K. Sakaluk, **W.B. Jaeckle**, and R.G. Harper. 2013. Eggshell permeability in clutches of House Wrens: implications for hatching asynchrony. AOU/COS meeting.
- Jaeckle, W.B. 2013. Seawater flow into the digestive system of actinotroch larvae (Phoronida). *Integrative Biology* 53(1): E302.
- Kehr-Smith, A.¹ and **W.B. Jaeckle**. 2013. Feeding modes by planulae of *Nematostella vectensis* (Cnidaria: Anthozoa). *Integrative Biology* 53(1): E307.
- Jaeckle, W.B. and R.R. Strathmann. 2012. The anus as a second mouth: anal suspension-feeding by an oral deposit-feeding sea cucumber. *Integrative Biology* 52(1): E269.
- McDonald, A.J.¹ and **W.B. Jaeckle**. 2012. Uptake of dissolved high molecular weight molecules by larvae of *Lytechinus variegatus*. *Integrative Biology* 52(1): E293.

¹denotes an IWU student