

# Roger Lew

## CONTACT INFORMATION

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## EDUCATION

### **Ph.D. in Neuroscience** 2014

College of Graduate Studies  
University of Idaho, Moscow, Idaho  
Dissertation: *Assessing Mental Workload from Multiple Physiological Measures Using Wavelets and Genetic Programming*

### **Masters in Human Factors Psychology** 2007

College of Letters, Arts, and Social Sciences  
University of Idaho, Moscow, Idaho  
Thesis: *Motion Transparency and Visual Direction Cues Affect Heading Perception and Control*

### **Bachelor of Science in Psychology** 2004

College of Letters, Arts, and Social Sciences  
University of Idaho, Moscow, Idaho

## WORK EXPERIENCE

### **University of Idaho**

*Research Assistant Professor, Department of Virtual Technology and Design* **April 2016 - Present**

Research interests include social ecological systems, control room human factors, pedestrian safety, evolutionary psychology, and transportation safety.

### **University of Idaho**

*Post Doctoral Researcher for Idaho EPSCoR MILES Project* **September 2014 - April 2016**

The Idaho EPSCoR MILES (Managing Idaho's Landscapes for Ecosystem Services) Project focuses on building sustainable research infrastructure that integrative research and decision making between disciplines and stakeholders.

- Design, develop, evaluate, and document virtual environments depicting landscape change
- Content creation for educational outreach and scientific communication
- Develop cyberinfrastructure to support the visualization of geospatial datasets
- Interdisciplinary collaboration building decision support tool for stakeholders to manage watershed erosion
- Project management using SCRUM

### **CRI Advantage (Subcontractor for Idaho National Laboratories)**

*Human Factors Engineer*

**October 2014 - Present**

Provided Human Factors expertise and software development for the Human Systems and Simulation Laboratory (HSSL) of the Human Factors, Controls, and Statistics Department has a full-scope, fully-reconfigurable nuclear power plant (NPP) control room simulator.

- Design, develop, evaluate, and document advanced digital control system prototypes
- Provide Human Factors guidance and evaluation to utilities in support of control room modernization efforts in accordance with NUREG 0700/0711
- Implement DCS mimics that interface with NPP models and enable formative evaluation and usability testing

**Idaho National Laboratory***Human Factors Intern***May 2013 - October 2014**

Conducted research related to control room modernization and computerized operator support systems.

**University of Idaho***Research Assistant/Associate***2010 - Present**

Assisted in design, execution, analysis, write-up, and presentation of multiple research projects.

- Designed and fabricated the majority of a half-cab wide field of view driving simulator located in the Human-in-the-Loop Simulation Laboratory
- Developed a data analysis and visualization Python toolkit for the National Advanced Driving Simulator (NADS) data acquisition (DAQ) files
- Developed an extensible framework for the Evolved Navigation Laboratory. The framework allows non-programmers to design and implement stimuli for an immersive wide area walking virtual reality system.
- Hypothesis driven analysis and visualization of large time series datasets using Python's scientific stack
- Opensource development of data processing and statistics libraries for Python
- Opensource process control MicroWorld supporting configurable levels of decision support automation

**University of Idaho***IDEA Network for Biomedical Research Excellence (INBRE) Research Fellow***2007 - 2010**

Gained formal training and knowledge in graduate level electrical engineering, computer science, and biology, psychology as well as crucial experience in computational modelling, signal processing, and data reduction and analysis.

- Developed computational models of human visual motion processing of non-rigid transparent motion
- Developed model of postural stability utilizing an adaptive Kalman filter
- Examined physiological correlates of cognitive workload using spectral analysis and machine learning algorithms (genetic programming, random forests, SVM)

## SELECTED ADVANCED COURSEWORK

Adaptive Signal Processing

Biological Signal Processing

Information Theory

Evolutionary Computation

Advanced Research Methods

Statistical Analysis

Advanced Human Factors

Ergonomics &amp; Biomechanics

Neurobiology

Engineering Psychology

Human Computer Interaction

Neuroergonomics

Cognitive Neuroscience

Ethics and Science

Psycholinguistics

## TEACHING EXPERIENCE

**University of Idaho**

Department of Virtual Technology and Design

**Spring 2016***Research Assistant Professor*

Virtual Cities 2 (LARC 404/VTD 404), VTD Senior Capstone

**University of Idaho**

Department of Psychology

**2011 - June 2014***Adjunct Instructor*

Introduction to Research Methods (PSYC 218), Sensation and Perception (Psyc 444),  
Engineering Psychology (Psyc 446)

**University of Idaho**

Upward Bound Math and Science (UBMS)

**Summer of 2009***Instructor*

5.0 high school course on cryptography, information theory, and Python programming

## University of Idaho

Research Undergraduate Experience (REU) Program

Summers of 2004-2007

*Mentor*

My mentee won Blue Ribbon Award at the 2008 Sigma Xi Annual Meeting

<http://www.uiweb.uidaho.edu/mcnair/newsandevents.htm>

## University of Idaho

Department of Psychology

2004 - 2006

*Graduate Teaching Assistant*

Introduction to Research Methods (PSYC 218), Ergonomics and Biomechanics (PSYC 452/552)

### SCHOLARLY AND PROFESSIONAL WORK

#### Refereed Publications

Boring, R. L., Lew, R., Ulrich, T. A., Savchenko, K. (2016). When human error is good: Applications of beneficial error seeding. *13th International Conference on Probabilistic Safety Assessment and Management (PSAM 13), At Seoul, Korea.*

Boring, R. L., Lew, R., Ulrich, T. A. (2016). Epistemiation: An approach for knowledge elicitation of expert users during product design. *Proceedings of the Human Factors and Ergonomics Society 2016 Annual Meeting.*

Boring, R. L., Ulrich, T. A., Lew, R. (2016). RevealFlow: A Process Control Visualization Framework. *In Foundations of Augmented Cognition: Neuroergonomics and Operational Neuroscience, 145-156.*

Lew, R., Lau, N, Boring, R. L., Anderson, J. (2016), The role of HCI in cross-sector research on grand challenges. *HCI in Business, Government, and Organizations: eCommerce and Innovation, 519-530.*

Barton, B. K., Heath, G., Lew, R. (2016). Detection and direction determination of approaching vehicle noises among older adults. *The International Journal of Aging and Human Development 82 (2-3), 229-250.*

Boring, R. L., Ulrich, T. A., Lew, R. (2015). Guideline for operational nuclear usability and knowledge elicitation (GONUKE). *6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the affiliated conferences, AHFE 2015. Procedia Manufacturing00.*

Boring, R. L., Ulrich, T. A., Thomas, K., Lew, R. (2015). Computerized Operator Support Systems to aid in decision making in nuclear power plants. *6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the affiliated conferences, AHFE 2015. Procedia Manufacturing00.*

Ulrich, T. A., Boring R. L., Lew, R. (2015). Control board digital interface input devices - Touchscreen, trackpad, or mouse? *Resilience Week 2015, At Philadelphia.*

Lew, R., Boring R. L., Ulrich, T. A. (2015). A tool for assessing the text legibility of digital human machine interfaces. *Resilience Week 2015, At Philadelphia.*

Ragsdale, A., Lew, R., Boring R. L. (2015). A study on trust alarms in nuclear power plant microworld simulation. *Resilience Week 2015, At Philadelphia.*

Boring, R. L., Ulrich, T. A., Lew, R. (2015). Dynamic operation wayfinding system (DOWS) for nuclear power plants. *Human Computer Interaction International 2015, Volume: Posters, Part II, Communications in Computer and Information Science 529.*

- Carthen, C. D., Rushton, T. J., Johnson, C. M. Hesson, A., Nielson, D., Worrell, B., Anderson, J. W., Lew, R., Wood, N. R., Ziegler, M., Delparte, D. M., Johansen, W. J., Dascalu, S. M., Harris, F. C. Design of a virtual watershed client for the WC-WAVE Project. *Collaboration Technologies and Systems (CTS), 2015 International Conference on, At Atlanta, GA.*
- Ulrich, T. A., Boring, R. L., Lew, R., Thomas, K. (2015). Computerized Operator Support System - Phase II Development. *The Ninth International Topical Meeting on Nuclear Plant Instrumentation, Control & Human-Machine Interface Technologies (NPIC & HMIT 2015), At Charlotte, NC, USA.*
- Ulrich, T. A., Lew, R., Boring R. L. (2014). A Computerized Operator Support System Prototype. *In Proceedings of the 58th Annual Meeting of the Human Factors and Ergonomics Society.*
- Boring, R. L., Joe, J. C., Ulrich, T. A., Lew, R. (2014). Early-stage design and evaluation of nuclear power plant control room upgrades. *In Proceedings of the 58th Annual Meeting of the Human Factors and Ergonomics Society.*
- Lew, R., Boring, R. L., Ulrich, T. A., Thomas, K. (2014). The initial development of a computerized operator support system. *Resilience Week 2014, At Denver, CO.*
- Lew, R., Boring, R. L., Ulrich, T. A. (2014). A prototyping environment for research on Human-Machine Interfaces in process control. *Resilience Week 2014, At Denver, CO.*
- Dyre, B. P., Adamic, E. J., Werner, S., Lew, R., Gertman, D., Boring, R. L. (2013). A Microworld Simulator for Process Control Research and Training. *In Proceedings of the 57th Annual Meeting of the Human Factors and Ergonomics Society.*
- Barton, B. K., Lew, R., Kovesdi, C., Cottrell, N. D., and Ulrich, T., (2013). Developmental differences in auditory detection and localization of approaching vehicles. *Accident Analysis and Prevention*, <http://dx.doi.org/10.1016/j.aap.2012.12.040>
- Spielman, Z. Bulkley, N., Dyre, B., Lew, R. Vargas, J, Hammack, T. (2013). Evaluation of a Peripherally-Located Instrument Landing Display Under Dual-Task Conditions. *International Symposium of Aviation Psychology 2013.*
- Barton, B. K., Ulrich, T. A., and Lew R. (2012). Auditory detection and localization of approaching vehicles. *Accident Analysis and Prevention*, 49, 347-353.
- Ragsdale, S. A., Lew, R., Dyre, B. P., and Boring, R. L. (2012). Fault diagnosis with multistate alarms in a nuclear power control simulator. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 56.
- Hope, R., Lew, R., Colby, K. A., and Dyre, B. P. (2012). Optically controlled braking responses to variable deceleration magnitudes in a car following task. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 56.
- Ragsdale, S. A., Lew, R., Dyre, B. P., and Boring, R. L. (2012). Alarm Strategy and Complexity: Predictions of Operator Response. *NPIC & HMIT.*
- Stanton, N., Lew, R., Boyle, N., Hope, R., Dyre, B., and Bustamante, E. A. (2011). An Implementation of a Graded Deceleration Display in Brake Light Warning Systems. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 55, (1), 1573-1577.
- Hope, R., Lew, R., Boyle, N., Stanton, N., Dyre, B., and Bustamante, E. A. (2011). Effects and Evaluation of the Graded Deceleration Display on Driver Braking Performance. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 55, (1), 1573-1577.
- Lew, R. Dyre, B., Soule, T., Ragsdale, S. A. and Werner, S. (2010). Assessing mental workload from skin conductance and pupillometry using wavelets and genetic programming. *In Proceedings of the 54th Annual Meeting of the Human Factors and Ergonomics Society.*

Bulkley, N. Caufield, K., Lew, R., and Dyre B. P. (2009). A Peripherally-Located Virtual Instrument Landing Display Affords More Precise Control of Approach Path during Simulated Landings than Traditional Instrument Landing Displays. *In Proceedings of the 53th Annual Meeting of the Human Factors and Ergonomics Society.*

Lew, R., Dyre, B. P., Werner, S., Wotring, B., and Tran, T. (2008). Exploring the potential of short-time fourier transforms for analyzing skin conductance and pupillometry in real-time applications. *In Proceedings of the 52th Annual Meeting of the Human Factors and Ergonomics Society*, 1536-1540.

Lew, R., Dyre, B. P. and Wotring, B. (2006). Effects of lane markings on steering errors while driving in blowing snow. *In Proceedings of the 50th Annual Meeting of the Human Factors and Ergonomics Society*, 1656-1660.

Dyre, B. P., Cooper, S., Lew, R. and Wotring, B. (2006). The magnitude of motion parallax affects control of egospeed. *In Proceedings of the 50th Annual Meeting of the Human Factors and Ergonomics Society*, 1666-1669.

Dyre, B. P. and Lew, R. (2005). Steering errors may result from non- rigid transparent optical flow. *In Proceedings of the 49th Annual Meeting of the Human Factors and Ergonomics Society*, 1531-1534.

### **Technical Reports**

Boring, R., Lew, R., Ulrich, T., Joe, J. (2014). A Computerized Operator Support Prototype. *Idaho National Laboratory INL/EXT-14-31511.*

Ulrich, T. Lew, R. Thomas, K., Boring, R. Villim, R. (2013). A Computerized Operator Support Prototype. *Idaho National Laboratory INL/EXT-13-29751.*

### **Refereed Abstracts**

Dobre, M., Brooks, E. S., Srivastava, A., Lew, R., Elliot, W. (2016). Modeling sediment yield and phosphorus in the Lake Tahoe basin with the Water Erosion Prediction Project (WEPP) model. *Fall 2016 American Geophysical Union, San Francisco, CA.*

Ulrich, T. A., Werner, S., Lew, R., Boring, R. (2016). COSSplay: Validating a Computerized Operator Support System using a Microworld Simulator. *In HCI International 2016 - Posters' Extended Abstracts*, 161-166.

Lew, R. and Dyre, B. P. (2008). Linear sub-space modeling responses to transparent motions comprised of radial dot flows. *Abstracts of the Vision Sciences Society.*

Dyre, B. P. and Lew, R. (2008). Environmental modulations of visually- induced steering errors resulting from non-rigid transparent optical flow. *Abstracts of the Vision Sciences Society.*

Lew, R., Dyre, B. P., Powers, A. and Yarbrough, F. (2007). Visually induced steering errors from simulated blowing snow are affected by environmental objects. *Abstracts of the Psychonomic Society 48th Annual Meeting, Long Beach, CA.*

Dyre, B. P. and Lew, R. (2005). Misperceived heading and steering errors occur when driving through blowing snow. *Abstracts of the Psychonomic Society 46th Annual Meeting, Toronto, ON.*

Dyre, B. P., Schaudt, W. A., and Lew, R. (2005). Contrast gradients increase apparent egospeed while moving through simulated fog. *Journal of Vision*, 5 (8), 335a.

### Refereed Book Chapters

Soule, T. Heckendorn R., B., Dyre B., and Lew, R. (2010). Ensemble Classifiers: AdaBoost and Orthogonal Evolution of Teams. In R. Riolo, T. McConaghy, and E. Vladislavleva editors, *Genetic Programming Theory and Practice VIII, volume 8 of Genetic and Evolutionary Computation*, chapter 4 ( pp. 55-69). Ann Arbor, USA, 2010

### SOFTWARE ENGINEERING

#### **WEPP Online**

Online Interface for the Watershed Erosion and Prediction Program. Watershed scale hydrologic model providing erosion and runoff estimates based on fire-severity predictions or post fire maps to aid landscape management.

<http://cals-wepponlinegis.ag.uidaho.edu/baer/>

#### **undaqTools**

undaqTools is the the unofficial pythonic interface to the National Advanced Driving Simulator (NADS) Data AcQuisition (DAQ) files (i.e. NADS miniSim (TM) datafiles). In contrast to ndaqTools, the focus of undaqTools is on data abstraction and simplification of data extraction via idiomatic python.

<http://pythonhosted.org/undaqTools/>

#### **pyvttbl**

PyvTbIs provides multi-dimensional pivot tables, data processing, statistical computation to Python.

<http://code.google.com/p/pyvttbl/>

#### **qsturng-py**

Modified implementation of Gleason's studentized range distribution approximations commonly used for multiple comparison testing such as single step procedures like Tukey's HSD as well as step-down procedures such as the Ryan or Ryan-Einot-Gabriel-Welsch Q (REGWQ) in Python. (Used by StatsModels).

<http://code.google.com/p/qsturng-py/>

#### **sdt-metrics**

Collection of signal detection theory (SDT) metrics for Python and Excel. Also provides a tool for visualizing signal detection theory data, and information and analysis of signal detection theory algorithms.

<http://code.google.com/p/sdt-metrics/>

#### **GUANO - Graphical User interface fro ANalysis of variance**

Free and open-source graphical user interface (GUI) for performing oneway between, within, or mixed ANOVAs.

#### **Android Cube Timer**

Niche Android application for generating Rubik's cube scrambles and measuring and logging solve times. <http://code.google.com/p/android-cubetimer/>