

Tom J Langbehn

POSTDOCTORAL RESEARCH FELLOW, THEORETICAL ECOLOGY GROUP

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I am a marine biologist, I use models that couple the environment, ecology & evolution to understand how processes at the individual level drive ecosystems

Education

Research Fellow / Doctoral student (PhD)

Bergen, Norway

DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF BERGEN

Feb 2016 - Mar 2019

- Dissertation title: "Modelling limits to northward range shifts of marine organisms under climate warming"
- Committee members: Prof. PhD Christian Jørgensen (University of Bergen), Prof. PhD Øyvind Fiksen (University of Bergen) and Associate Prof. PhD Øystein Varpe (University Centre in Svalbard).
- Opponents: Prof. PhD Michael T. Burrows (Scottish Association for Marine Science, UK), PhD Xabier Irigoien (AZTI, Spain)

Graduate Programme Marine Biology (M.Sc.)

Bremen, Germany

FACULTY 2 BIOLOGY/CHEMISTRY, UNIVERSITY OF BREMEN

Oct 2013 - Oct 2015

- Thesis title: "Feeding success in an extreme light environment: modelling seasonal prey encounter of Arctic fish"
- Committee members: Prof. Dr. Wilhelm Hagen (University of Bremen) and Associate Prof. PhD Øystein Varpe (University Centre in Svalbard)
- Final grade: excellent

International Degree Course in Environmental and Industrial Biology (B.Sc.)

Bremen, Germany

FACULTY 5 NATURE AND ENGINEERING, UNIVERSITY OF APPLIED SCIENCES BREMEN

Sep 2009 - Feb 2013

- Thesis title: "Morphological diversity in parr of Atlantic salmon (*Salmo salar* L.) in Iceland"
- Committee members: Prof. Dr. Heiko Brunken (University of Applied Sciences Bremen) and Prof. PhD Guðrún Marteinsdóttir (University of Iceland)
- Final grade: excellent

Research Experience

Learning Math with Jupyter Notebooks

University Park, PA

PROJECT MANAGER

Sep. 2020 - Present

- Assisting Dr. Jan Reimann (Associate Professor of Mathematics) in developing accessible Jupyter Notebook systems for Math 110 (Techniques of Calculus).

Online Interactions of the Blind Research Project

University Park, PA

PRINCIPAL INVESTIGATOR

May. 2019 - Present

- Conducting quantitative ethnography research on how blind learners pursue STEM disciplines as captured through a large-scale mailing list-servs.
- Using data science, computational linguistics (i.e., unsupervised machine learning for text mining; natural language processing) approaches coupled with conventional ethnographic methods.

Accessible RMarkdown Online Writer (AROW) Project, Teaching and Learning with Technology (TLT)

University Park, PA

PROJECT MANAGER

May. 2018 - Present

- Developed an accessible web application for people with dis/abilities to easily compose a high-quality scientific document based on LAMP, AJAX, R Markdown, and MathML.

Accessibility of Maker Toolkits Research Project

University Park, PA

PRINCIPAL INVESTIGATOR

Jun. 2017 - Present

- Conducting usability and design research on how to make current electronics and maker toolkits more accessible for learners with visual impairments.

Playful Learning and Inclusive Design Research Group

University Park, PA

GRADUATE RESEARCHER

Aug. 2016 - Present

- Conducting interaction analysis and microethnographic studies for Dr. Gabriela Richard's inclusive gaming for learning and accessible makespaces for youth with diverse background.

IT Accessibility Team, Teaching and Learning with Technology (TLT)

University Park, PA

GRADUATE ASSISTANT

Aug. 2016 - Present

- Developing and consulting accessible HTML5/CSS3/JS webpages for Penn State University sites and learning management tools.
- Evaluating suitability of digital badges according to web content accessibility guidelines (WCAG) 2.0.

Avenue PM Research Group

University Park, PA

GRADUATE RESEARCHER

Sep. 2014 - May. 2016

- Participated in Dr. Simon Hooper's grant project sponsored by the U.S. Department of Education Stepping Stones Phase II program.
- Improved web accessibility for deaf-blind learners by removing blockers on website platform.

Working Experience

Rstudio PBC

Boston, MA

SOFTWARE ENGINEER INTERN

May. 2020 - Aug. 2020

- Worked on accessibility improvement projects for Rstudio Server and Desktop IDE, Shiny and Rmarkdown.
- Patched Shiny's bootstrap dependencies to improve navigation of Shiny apps for screen-reader and keyboard users (alert, tooltip, popover, modal dialog, dropdown, tab Panel, collapse, and carousel elements). (Shiny PR #2911)
- Made selectInput widget accessible by patching selectize-a11y-plugin JS library. (Shiny PR #2993)
- Developed a way to pass dynamic alt attribute for reactive plot objects in Shiny UI. (Shiny PR #3006)
- Made fontawesome and glyphicon readable to assistive technologies in Shiny UI. (Shiny PR #2917)
- Developed JS code to resolve accessibility issue in highlighted code blocks of HTML output produced by Pandoc for screen reader users. (Rmarkdown PR #1833)
- Authored technical documents on how to run RStudio Server via Windows Subsystem for Linux and RStudio Screen Reader Support.

ICE Soft

Seoul, South Korea

CO-FOUNDER AND PROJECT MANAGER

Jul. 2010 - Jun. 2011

- Co-founded and managed a start-up company to develop Android-based navigation App and assistive technology for blind people.
- Applied for and received a \$30,000 fund from the city of Seoul.

Publications

REFEREED JOURNAL PAPERS

Seo, J. (2019). Is the maker movement inclusive of ANYONE?: Three accessibility considerations to invite blind makers to the making world. *TechTrends*, 63(5), 514–520. <https://doi.org/10.1007/s11528-019-00377-3>

Seo, J., & McCurry, S. (2019). LaTeX is not easy: Creating accessible scientific documents with r markdown. *Journal on Technology and Persons with Disabilities*, 7, 157–171.

WORKING PAPERS UNDER REVISION OR REVIEW

Richard, G. T., & **Seo, J.** (accepting with minor revision). Able to play, ready to learn: Proposing an intersectional, critical dis/abilities framework for research, design and practice in video games and learning. *Disability Studies Quarterly*.

Seo, J., & Richard, G. T. (under review). Learning analytics on a large-scale email corpus with r: Descriptive, network, and machine learning analysis. In *International conference on learning analytics and knowledge (lak) 2021*. Society for Learning Analytics Research (SoLAR).

Seo, J., & Richard, G. T. (under review). SCAFFOLDing all abilities into makerspaces: Universal design framework for accessible maker movement. *Journal of Information and Learning Sciences*.

PAPERS IN REFEREED CONFERENCE PROCEEDINGS

Seo, J., & Richard, G. T. (2020). Coding through touch: Exploring and re-designing tactile making activities with learners with visual dis/abilities. In M. Gresalfi & I. Horn (Eds.), *Interdisciplinarity in the learning sciences, 14th international conference of the learning sciences (icls) 2020* (Vol. 3, pp. 1373–1380). Nashville, TN: International Society of the Learning Sciences (ISLS).

Seo, J. (2019). Discovering informal learning cultures of blind individuals pursuing stem disciplines: A quantitative ethnography using listserv archives. *The first international conference on quantitative ethnography: Doctoral consortium*, S66–S67. Madison, WI. *Awarded the best Doctoral Consortium Proposal Cengage fellowship*.

Seo, J. (2018). Accessibility and inclusivity in making: Engaging learners with all abilities in making activities. In *Proceedings of the 3rd learning sciences graduate student conference* (pp. 141–142). Nashville, TN: LSGSC Planning

Team.

Seo, J., & Richard, G. T. (2018). Accessibility, making and tactile robotics: Facilitating collaborative learning and computational thinking for learners with visual impairments. In J. Kay & R. Luckin (Eds.), *Rethinking learning in the digital age: Making the learning sciences count, 13th international conference of the learning sciences (icls) 2018* (Vol. 3, pp. 1755–1757). London, UK: International Society of the Learning Sciences (ISLS).

Konecki, M., Lovrenčić, S., **Seo, J.,** & LaPierre, C. (2017). The role of ict in aiding visually impaired students and professionals. *Proceedings of the 11th Multidisciplinary Academic Conference*, 148.

Seo, J., AlQahtani, M., Ouyang, X., & Borge, M. (2017). Embracing learners with visual impairments in cscl. In B. K. Smith, M. Borge, E. Mercier, & K. Y. Lim (Eds.), *Making a difference: Prioritizing equity and access in cscl, 12th international conference on computer supported collaborative learning (cscl) 2017* (Vol. 2, pp. 573–576). Philadelphia, PA: International Society of the Learning Sciences (ISLS).

Presentations

PEER-REVIEWED CONFERENCE PRESENTATIONS

Seo, J. (accepted). *Accessible data science beyond visual models*. Talk will be presented at the rstudio::global(2021), Virtual.

Seo, J., & Richard, G. T. (accepted). *Uncovering latent topics of blind people in computer science: structural topic modeling for an email corpus*. Poster will be presented at the second International Conference on Quantitative Ethnography (ICQE), Malibu, CA.

Donegan, S. R., Porter, C., Fogel, A., **Seo, J.,** Choi, S., & Eagan, B. (accepted). *U.S. media coverage during COVID-19: an epistemic network analysis of bias, topic, and trajectory*. Poster will be presented at the second International Conference on Quantitative Ethnography (ICQE), Malibu, CA.

Seo, J. (2020, September). *Discovering knowledge sharing patterns of blind people pursuing STEM disciplines: data science and computational linguistics on large-scale email corpora*. Poster presented at the Doctoral Consortium of the annual meeting of the ACM Richard Tapia Celebration of Diversity in Computing, virtual. *Awarded the Qualcomm scholarship*.

Seo, J., & Richard, G. T. (2020, April). *Maker inclusivity = maker accessibility: further interrogations for diverse participation*. Poster presented at the annual meeting of the American Educational Research Association (AERA), Virtual.

Seo, J., & Richard, G. T. (2018, April). *Furthering inclusivity in making: a framework for accessible design of makerspaces for learners with disabilities*. Poster presented at the annual meeting of the American Educational Research Association (AERA), New York City, NY.

Bunag, T., Aniela, L., Nielsen, M. C., & **Seo, J.** (2017, November). *The rapidly changing world of accessible online learning*. Presented at the Panel Discussion: DDL - Accessible Online Learning In Concurrent Presentation of the Association for Educational Communications and Technology (AECT), Jacksonville, FL.

Seo, J. (2017, September). *Tactile access to visualized statistical data using R*. Poster presented at the annual meeting of the ACM Richard Tapia Celebration of Diversity in Computing, Atlanta, GA.

Liao, J., Patcyk, M., **Seo, J.,** & Hooper, S. (2016, October). *Using hierarchical linear modeling to measure growth rate in a gamified CBM environment*. Paper presented at the annual meeting of the Northeastern Educational Research Association (NERA), Trumbull, CT.

Seo, J. (2016, March). *Engaging blind learners in statistics study using R*. Presented at the annual meeting of the Teaching and Learning with Technology (TLT) Symposium, University Park, PA.

Kim, K., **Seo, J.,** & Clariana, R. B. (2016, March). *Automatic knowledge structure measure in online courses*. Presented at the annual meeting of the Teaching and Learning with Technology (TLT) Symposium, University Park, PA.

Seo, J. (2015, November). *Assistive technologies for equal access in general education*. Presented at the annual meeting of the Association for Educational Communications and Technology (AECT), Indianapolis, IN.

Seo, J., & Park, E. (2015, October). *The more accessible, the more potential: simple tips for online accessibility.* Presented at the Technology and Learning Conference, Blue Bell, PA.

INVITED GUEST LECTURES

EIT Accessibility Group, The Pennsylvania State University

University Park, PA

BLOCKERS FOR USERS ON A SCREEN READER

Oct. 2019

- Invited guest talk to a webinar to train Penn State instructional designers for key WCAG 2.1 guidelines to make content more accessible including: image alt text, clear link text and heading structure, proper table structure, form and button labels, the need for keyboard functionality and how to convey information regardless of visual formatting.

Chonnam National University

Gwangju, South Korea

A SMALL STEP TO TAKE YOUR DATA ANALYSIS TO ANOTHER LEVEL

Jul. 2019

- Invited guest talk to CNU to teach nursing faculty and students for basic concept of machine learning, computer-assisted text mining, and topic modelling to improve their qualitative data reliability.

Sungkyunkwan University

Seoul, South Korea

BEING A REASONABLE REALIST: WISE NEGOTIATION BETWEEN GIVE AND TAKE

Jun. 2019

- Invited guest talk to SKKU "Student Success Center" as one of the successful role models to inspire undergraduate students for future planning.

The MathML Meeting, The Pennsylvania State University

University Park, PA

ACCESSIBILITY OF MATH, STATISTICS, AND SOCIAL SCIENCES

May. 2019

- Invited guest talk to Penn State MathML group to present assistive technology and accessibility for STEM content.

BBVS Summer Academy STEM Extension

University Park, PA

KEY-NOTE SPEECH FOR STEM EXTENSION

Jul. 2018

- Invited key-note speaker to the STEM (Science, Technology, Engineering, and Mathematics) week of "The Summer Academy for Students who are Blind or Visually Impaired."
- Hosted by the Pennsylvania Department of Labor and Industry, Office of Vocational Rehabilitation's Bureau of Blindness and Visual Services, in partnership with the Pennsylvania Department of Education, Bureau Of Special Education's Pennsylvania Training and Technical Assistance Network and Pennsylvania State University's College of Education and College of Health and Human Development.

LDT 100 - "World Technologies and Learning", The Pennsylvania State University

University Park, PA

ADAPTIVE TECHNOLOGY LESSON

Apr. 2018

- Two times invited guest talk to Dr. Joshua Kirby's class for the week of "The Cost of 21st Century Education."

LDT First Friday Speaking Series, The Pennsylvania State University

University Park, PA

UNIVERSAL DESIGN 101: THREE FUNDAMENTAL FRAMEWORKS FOR AN EQUITABLE WORLD

Apr. 2017

- Invited guest talk to the Learning, Design, and Technology (LDT) program of Penn State to introduce theoretical and practical background of Universal Design for Learning.

Northwestern University

Evanston, IL

INCLUSIVE MAKING

Oct. 2017

- Invited guest talk to Dr. Marcelo Worsley's "Inclusive Making" class for Learning Sciences Program.

The Accessibility Users Group, The Pennsylvania State University

University Park, PA

ACCESSIBILITY TESTING USING NVDA

Jul. 2017

- Invited guest talk to the Penn State online learning Accessibility User Group to train web accessibility testing with open-source screen reader NVDA.

Canvas Day 17

University Park, PA

NON-VISUAL ACCESS TO CANVAS WITH ASSISTIVE TECHNOLOGY

Mar. 2017

- Invited guest to a showcase of Canvas, a learning management tool, to demonstrate how to interact with the online system using assistive technology for students with disabilities.

Ed-ICT International Network: Disabled students, ICT, post-compulsory education & employment

Seattle, WA

STUDENT PANEL DISCUSSION: STUDENT ISSUES

Mar. 2017

- Invited student panel to the first Ed-ICT International Network symposium.

Korea Employment Promotion Agency for the Disabled

Gyeonggi, South Korea

ACCESSIBILITY: THE FIRST STEP TOWARDS ABILITY

Jul. 2016

- Invited guest talk to KEAD to train the employees in concept of accessibility and universal design.

Awards and Honors

Best Presentation Award

ICES ANNUAL SCIENCE CONFERENCE 2019

Hamburg, Germany

2019

Student Choice and Special Mention Poster Award

IMBER CLIMEco5 SUMMER SCHOOL

Natal, Brazil

2016

Best Poster Award

YOUNARES 7 CONFERENCE, GERMAN SOCIETY FOR MARINE RESEARCH

Hamburg, Germany

2016

MARUM Research Award for Marine Science

MARUM CENTER FOR MARINE ENVIRONMENTAL SCIENCE

- awarded in recognition of an outstanding Masters

Bremen, Germany

2015

Best Speaker Award

YOUNARES 6 CONFERENCE, GERMAN SOCIETY FOR MARINE RESEARCH

Bremen, Germany

2015

Best Student Poster

FISHERIES ECOLOGY SUMMER SCHOOL, UNIVERSITY OF ICELAND

Reykjavík, Iceland

2011