RESEARCH COMPUTING AND
DATA SCIENCE
SYMPOSIUM

SCHEDULE
Bruce M. Pitman Center, Vandal Ballroom

8:15 Registration: Light breakfast options provided

9:00 Welcome: Daniel Ewart, VP UI ITS/Dr. Barrie Robison, IBEST Director

9:15 Keynote Speaker: Josh Hartung, Founder of PolySync
Perspectives on the Use of Deep Learning in Autonomous Cars

10:15 Break

10:30 Lightning Talk: Dr. Larry Forney, UI Biological Sciences
Causes and consequences of spatial structure in the microbial world

10:40 Lightning Talk: Dr. Jason Kelley, UI Soil & Water Systems
Use of neural networks for data assimilation and analysis

10:50 Lightning Talk: Dr. Katherine Hegewisch, UI Geography
Visualizing Climate and Remote Sensing Datasets on the Web

11:00 Lightning Talk: Brian Jemes, UI ITS
Network Monitoring, Troubleshooting and Planning Tools for UI, IRON, and Internet 2

11:10 IBEST Computational Resources Core (CRC)
Key Speaker: Dr. Benjamin Oswald
CRC: Your partner in high-performance computing

11:25 Lunch: Provided

12:30 Lightning Talk: Amanda Stahlke, BCB PHD Student
Innovation in conservation at the invasion front

12:40 Lightning Talk: Dr. Michael Overton, UI Politics & Philosophy
Public sector data literacy

12:50 Lightning Talk: Dr. Audrey Fu, UI Statistical Sciences
Imputation of single-cell gene expression with deep learning

1:00 Lightning Talk: Tanner Varrelman, BCB PHD Student
Forecasting Lassa Fever Epidemics

1:10 Northwest Knowledge Network (NKN)
Key Speaker: Dr. Luke Sheneman
NKN: Enabling Science With an Interactive Data Observatory

1:25 Lightning Talk: Jennifer Hinds, NKN Mother of Drones
Supporting research with UAS data collection and image processing

1:35 Lightning Talk: Dr. Ross Kunz, Idaho National Laboratory
Idaho National Laboratory and Data Analytics

1:45 Lightning Talk: Dr. Marek Borowiec, UI Entomology, Plant Pathology, and Nematology
Manipulation/trimming large sequence alignments/deep learning for automated species identification from images

1:55 Lightning Talk: Dr. James Alves-Foss, UI Computer Science
Security and Privacy in the world of Big Data

2:05 IBEST Genomics Resources Core (GRC)
Key Speaker: Dr. Samuel Hunter
GRC: Putting Genomics to Work for Idaho

2:20 Poster Session and Reception

**4:00** Closing Remarks: Dr. Barrie Robison, IBEST Director

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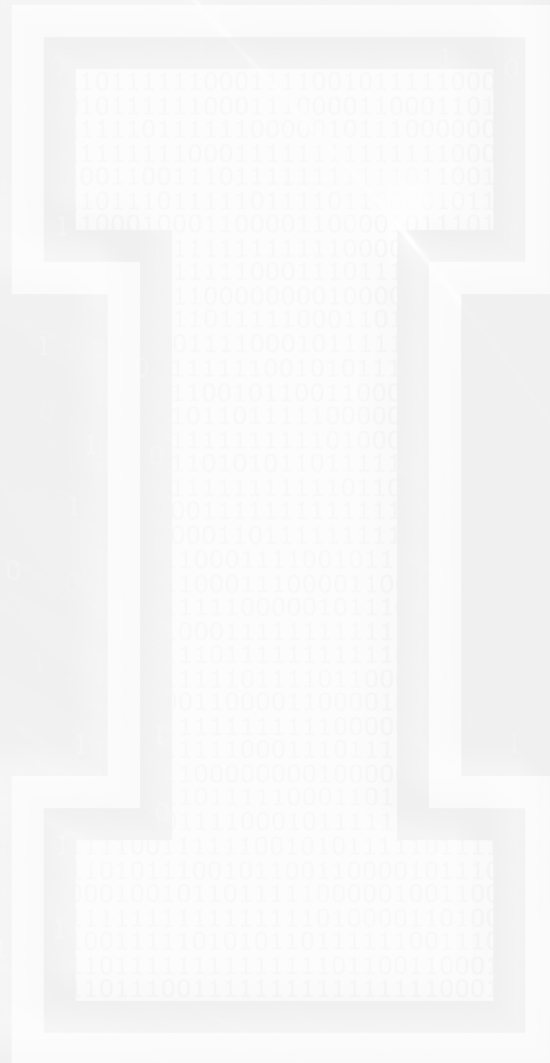
KEYNOTE SPEAKER

Josh Hartung
Founder of PolySync

TITLE: *Perspectives on the Use of Deep Learning in Autonomous Cars*

BIO: As CEO and founder of PolySync Technologies, Josh Hartung spent seven years helping design and build data infrastructure for the nascent autonomous vehicles industry. His unique perspective on this fascinating technology is informed from work with tech titans, automotive OEMs, and startups across the ecosystem. Prior to founding PolySync, Josh was CTO of AutonomouStuff and founder of a string of tiny and unsuccessful consumer product companies. He now resides in Moscow, ID, spending lots of time with his kids and trying hard not to start another company.
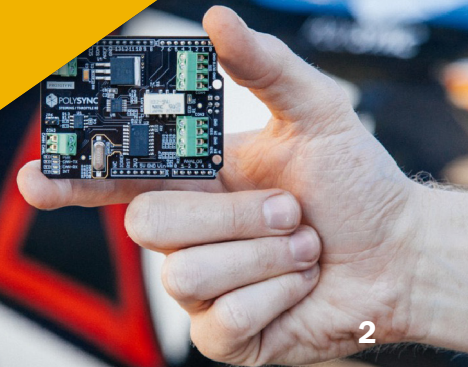
Daniel Ewart

VP for Informational Technology/CIO
UI ITS
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Dan Ewart assumed the position of Vice President for Information Technology/CIO at the University of Idaho on January 1, 2018 after serving as Vice President for Infrastructure from 2015-2018 and as UI's Chief Information Officer since February 2012. Dan previously worked at the University of Wyoming and Accenture. He serves on the board of Smart Transit, serves as President for Partnership for Economic Prosperity (economic development for Latah County) and is active in many areas of collaboration between UI and the City of Moscow and has previous experience serving on a county hospital board in Wyoming.

Educational Background:
B.S. Management Information Systems, University of Wyoming, 1993
Master of Public Administration (MPA), University of Wyoming, 2010

Dr. Barrie Robison

Director
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Barrie Robison is a Professor in the department of Biological Sciences and has served as Director of IBEST since February 2018. Trained as an evolutionary biologist and quantitative geneticist, his work has focused on the genetic basis of life history and behavioral traits. At the University of Idaho, Dr. Robison studied the genetic basis of behavioral evolution during adaptation to captivity using a zebrafish model. In 2014, he co-founded Polymorphic Games, an interdisciplinary video game studio in which undergraduates from art, science, and engineering create evolutionary video games. In these games, the opponents are modeled as evolving populations that adapt to player's strategies. The studio has released two games on STEAM, "Darwin's Demons", an evolutionary space shooter, and "Project Hastur", an evolutionary tower defense game.

Dr. Larry Forney
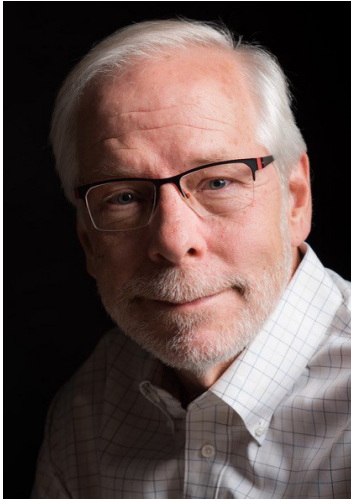
Causes and consequences of spatial structure in the microbial world

Dr. Larry Forney is a University Distinguished Professor and a member of the American Academy of Microbiology with academic appointments in the Department of Biological Sciences and Bioinformatics and Computational Biology at the University of Idaho. Dr. Forney is an evolutionary ecologist who conducts research on bacterial community ecology of the human vagina across a woman's lifetime and has expanded his research on the human microbiome to include skin, semen, and the gastrointestinal tract. In these studies he works with clinicians, mathematicians and other scientists to explore the complex array of factors that influence the function, composition, structure and dynamics of the human microbiome.

His studies have shown that vaginal bacterial communities of reproductive-age women of different ethnic groups and ages can be clustered into five main groups that can be distinguished based on the predominant taxa present. Four of the five communities are dominated by different species of Lactobacillus while the fifth includes a variety of other anaerobe species and exhibits greater evenness. An important finding from these studies is that the distribution of community types varies significantly among women from different ethnic backgrounds as did the mean vaginal pH. This has important implications for the diagnosis of bacterial vaginosis and in assessing the risk of individuals to sexually transmitted infections. In studies on the temporal dynamics of vaginal communities his research team discovered that the composition of vaginal microbial communities is highly personalized. Some change markedly and rapidly over time, whereas others are relatively stable suggesting that the degree of risk to various maladies probably change over time as well.

His research extends to understanding the mutation-selection processes that govern the occurrence and persistence of genetic diversity and antibiotic resistance in spatially structured environments such as microbial biofilms. In addition, Dr. Forney is also the principal investigator of an NIH Center of Biomedical Research Excellence focused on interdisciplinary research in computational and evolutionary biology to understand how organisms respond to selective pressure, the factors that influence extant diversity, and to identify factors drive the tempo and trajectory of evolutionary processes.

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Dr. Jason Kelley

Jason Kelley works as an assistant professor in the Department of Soil and Water Systems at the University of Idaho. He received a PhD in Water Resources Engineering at Oregon State University. His current research includes crop water demand and irrigation, evapotranspiration, and environmental hydrology. One particular focus of this work is to use machine learning to utilize on-farm weather data to support optimal water allocations and to manage risks to crops.

Assistant Professor
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Dr. Katherine Hegewisch

Research Scientist
UI Geography
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Dr. Katherine Hegewisch is a research scientist in the Department of Geography at the University of Idaho in Moscow, ID. She earned a Ph.D. in Physics from Washington State University in 2010 and also has degrees in Applied Mathematics and Statistics. Since 2011, she has been working with climatologist Dr. John Abatzoglou in the Applied Climate Science Lab as a climate data analyst, a climate data provider and a web developer of visualization tools for both climate and remote sensing datasets. Two web tools she has worked on are ClimateToolbox.org and ClimateEngine.org.

Brian Jemes

Network Manager
UI ITS
jemes@uidaho.edu

Network Monitoring, Troubleshooting and Planning Tools for UI, IRON, and Internet 2

Brian has been the Network Manager for the University of Idaho since 2006. Prior to working in higher education, Brian was a Hewlett-Packard IT Network Architect where he led the network design for major projects, including the HP-Agilent split, the HP-Compaq merger and the HP Adaptive Network Architecture. Brian graduated from Stanford University in 1989 with a BS in Computer Science.

Dr. Benjamin Oswald

Director
IBEST Computational
Resources Core
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Dr. Benjamin Oswald has been the Director of the IBEST Computational Resources Core since 2015, and has been working in the CRC since 2013. Dr. Oswald manages the CRC datacenter, and works with researchers to ensure that the HPC infrastructure at UI meets on campus needs. He earned a Ph.D. from the University of Idaho in Bioinformatics and Computational Biology in 2010.

Amanda Stahlke

PhD Student
UI Bioinformatics and
Computational Biology
astahlke@uidaho.edu

Innovation in conservation at the invasion front

Amanda Stahlke is a PhD Candidate in the Bioinformatics and Computational Biology Program and Research Assistant in the Hohenlohe Lab at the University of Idaho. She studies evolutionary genomics of managed species with the goal of informing management decisions, from Tasmanian Devils to introduced biocontrol agents and invasive plants. Her research uses simulations, reduced representation sequencing, and whole genomes to understand contemporary, rapid evolution.

Dr. Michael Overton

Assistant Professor
UI Politics & Philosophy
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Public sector data literacy

Michael Overton (Ph.D., University of North Texas, 2015) is an assistant professor of public administration where he uses his public sector experience to identify research topics that matter to government entities. His research into local governments has been funded by the Department of Housing and Urban Development, the Lincoln Institute of Land Policy, SMART Transit, the North Central Texas Council of Governments and published in prominent public administration journals including *The Review of Regional Studies, The American Review of Public Administration, State and Local Government and Public Money and Management*.

Over the brief tenure of his career, he has received prestigious awards for his scholarship. In 2015, he won the Toulouse Dissertation Award in Social Science for best social science dissertation at UNT. He was selected for the 2016 Lincoln Scholars Program hosted by the Lincoln Institute of Land Policy and recently, he was honored as a 2017 American Society of Public Administration Founders Fellow.

Dr. Audrey Fu
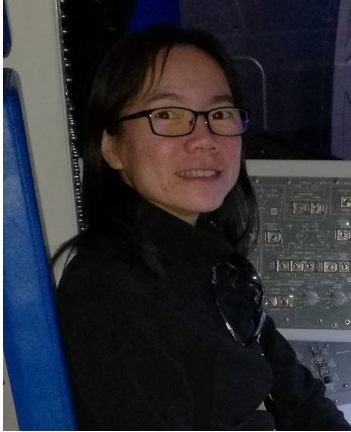
Assistant Professor
UI Statistical Sciences
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Imputation of single-cell gene expression with deep learning

Trained as a statistician and statistical geneticist, I develop statistical methods and machine learning algorithms for genomic data. My small lab has two focuses, one on methodologies for inferring causal networks from genotype and gene expression data, and the other on deep learning algorithms for single-cell genomic data. We develop open-source software packages and share them via GitHub (https://github.com/audreyqyfu).

Tanner Varrelman

PhD Student
UI Bioinformatics and
Evolutionary Studies
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Forecasting Lassa Fever Epidemics

I am a PhD Student in the BCB program here at the University of Idaho. My research focuses on understanding how heterogeneity in host populations influences the effectiveness of transmissible vaccines and how GIS data can be used to forecast the emergence of infectious disease.

Dr. Luke Sheneman

After earning his Bachelor's degree in Computer Science from the University of Idaho, Luke Sheneman worked in Silicon Valley for a number of established and start-up internet companies including Netscape Communications, BigVine, and Inktomi. Luke then returned to UI and earned his Ph.D. in Bioinformatics and Computational Biology in 2008 while also somehow finding time to raise two daughters and build a small cabin in the woods. Dr. Sheneman currently directs the IBEST Northwest Knowledge Network (NKN) and manages an exceptionally talented group of data managers and web developers.

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Jennifer Hinds

Research Applications Architect
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Jennifer Hinds is a Research Applications Architect with the Northwest Knowledge Network (NKN) and head of NKN's drone program (aka, Mother of Drones). She earned an M.S. degree in geology from University of Colorado and conducted hydrogeological research for the Lawrence Berkeley National Laboratory before coming to the U of I. In her role at NKN, Jennifer designs and develops data-driven web applications for a wide variety of research activities. Recently, she spearheaded NKN's program to deliver UAS services (image acquisition and processing) to support research and marketing at U of I.

Dr. Ross Kunz

Statistician
Idaho National Laboratory
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Dr. M. Ross Kunz is statistician for Idaho National Laboratory developing high-dimensional data visualization in 2D/3D environments and explainable AI techniques. His explainable AI work focuses on the fusion of machine learning and physics applied to a variety of tasks including chemical kinetics, nuclear process control, geology and electric vehicles. He has developed a 3-D visualization framework that allows emergency planners to simulate responses to various safety and security scenarios. His visualization has been presented at the White House and is now being used by federal, state and municipal leaders to plan for expanded use of electric vehicles. He holds a PhD in statistics from Florida State University and a bachelor's in statistics from Idaho State University. Before joining INL in January 2015 he was a statistician for Michelin of North America.

Dr. Marek Borowiec

Assistant Professor
UI Entomology, Plant Pathology, and Nematology
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Manipulation/trimming large sequence alignments/deep learning for automated species identification from images

Marek's research focuses on biodiversity, including its cataloging and description (taxonomy), and processes that created it (speciation, phylogeny). He integrates field work, morphology, molecular data, and comparative methods to advance systematics of insects, especially ants. He is also interested in computing and analysis of large data sets in general and works on developing new bioinformatic tools for phylogenetics. Currently he is working on applying machine learning algorithms to problems of species identification and delimitation.

Dr. James Alves-Foss

Security and Privacy in the world of Big Data

Jim Alves-Foss is a professor of computer science and is the Director of the Center for Secure and Dependable Systems (est. 1998). He has been at the University of Idaho since 1991. Dr. Alves-Foss received his Ph.D in Computer Science from the University of California, Davis (UCD) in 1991, his M.S. in Computer Science from UCD in 1989 and his B.S. in Physics, Mathematics and Computer Science from UCD in 1987.

University Distinguished Professor
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Dr. Samuel Hunter

Director
IBEST Genomics Resources Core
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Dr. Hunter is a bioinformatician and director of the IBEST Genomics Resources Core. He works at the intersection of Biology, Computer Science, and Statistics, with degrees in all three fields. His research interests can be broadly summarized as solving problems with high throughput sequencing and genomics technologies. Dr. Hunter has collaborated on a wide variety of projects resulting in publications in topics including the molecular basis for sex differentiation in rainbow trout, retinal regeneration in zebrafish, copy number analysis for cancer sequencing and personalized medicine, bacterial genome assembly and antibiotic resistance, and characterizing endophytes in wheat seeds. As director of the IBEST Genomics Resources Core, Dr. Hunter works to enable research at the University of Idaho by ensuring that researchers have access to the latest in technology, experimental design, and analysis strategies for genomics data.

POSTERS

Savannah Rogers **1**	UI Bioinformatics and Computational Biology	*Climatic Constraints on Energy Balance, Behavior, and Spatial Distribution of Grizzly Bears*
Rayan Alshamrani **2**	UI Computer Science	*Predicting Students' Final Outcomes by Analyzing Early Indicators*
Ashraf Althbiti **3, 4**	UI Computer Science	*Semantic prediction of the attribute of Arabic idioms from rating records* *Personalized Course Recommender System based on Content Approach*
Abdullah Alowairdhi **5**	UI Computer Science	*Toward an implementable framework of FAIR principles for Earth science data management and stewardship*
Sarah Hendricks **6**	UI Bioinformatics and Computational Biology	*Outfoxing Cancer: Genetic isolation and a unique disease threatening the island fox.*

Alexandra Fraik **7**	WSU School of Biological Sciences	*Are transcriptomic responses to hydrogen sulfide exposure shared between two evolutionarily divergent taxa?*
Evan Martin **8**	UI Bioinformatics and Computational Biology	*A Bayesian Approach to Causal Gene Regulatory Networks*
Benji Oswald **9**	IBEST Computational Resources Core	*IBEST CRC Resources*
Katherine Hegewisch **A, 10, 11**	UI Geography	*Northwest Climate Toolbox* *Climate Engine*
Omar Alghushairy **12**	UI Computer Science	*Genetic based Incremental Local Outlier Factor Algorithm for Efficient Data Stream Processing*

Kenetta Nunn **13**	UI Bioinformatics and Computational Biology	*Vaginal glycogen is associated with Vaginal bacterial community composition in black adolescent women*
Clinton Elg **14**	UI Bioinformatics and Computational Biology	*Correlogy: Predicting Gene Interactions using Correlation of Homologous Gene*
Thibault Stalder **15**	UI Biological Sciences	*Finding the Hosts of the Resistome and Plasmidome*
Salvador Castaneda Barba **16**	UI Bioinformatics and Computational Biology	*Plasmid-host quantification in soil using Hi-C method*
Martyna Lukaszewicz, **Ousseini Issaka Salia** **17**	UI Bioinformatics and Computational Biology Center for Modeling Complex Interactions	*Approximate Bayesian Computational Statistical Methods to Identify Loci Under Selection from Genomic Data*

Jane Lucas **18**	UI Soil and Water Systems	*The microbial ecology of ant nests*
Carrie Roever **B**	IBEST Northwest Knowledge Network	*The Northwest Knowledge Network, Research Data and Techology Services*
James Van Leuven **19**	Center for Modeling Complex Interactions	*Rabies virus whole genome sequencing illuminates disease transmission patterns*
Richard White III **20**	Washington State University	*ATLAS (Automatic tool for local assembly structures) for metagenomic and metatranscriptomic analysis*
Amal Aljohani **21**	UI Computer Science	*Payment's preference prediction*

Jill Johnson **22**	UI Biological Sciences	*Data mining analysis of the Hsp90 molecular chaperone machine*
Benjamin Plaster **23**	UI Chemical and Materials Engineering	*Hybrid Deep Neural Network based Predictive Modeling of Dynamical Systems*
Polymorphic Games **C**	UI Polymorphic Games Studio	*Polymorphic Games: Evolutionary Video Games*
Xiaogang Ma **D**	UI Computer Science	*Using a three-dimensional Klee diagram to show co-relationships among minerals and elements*

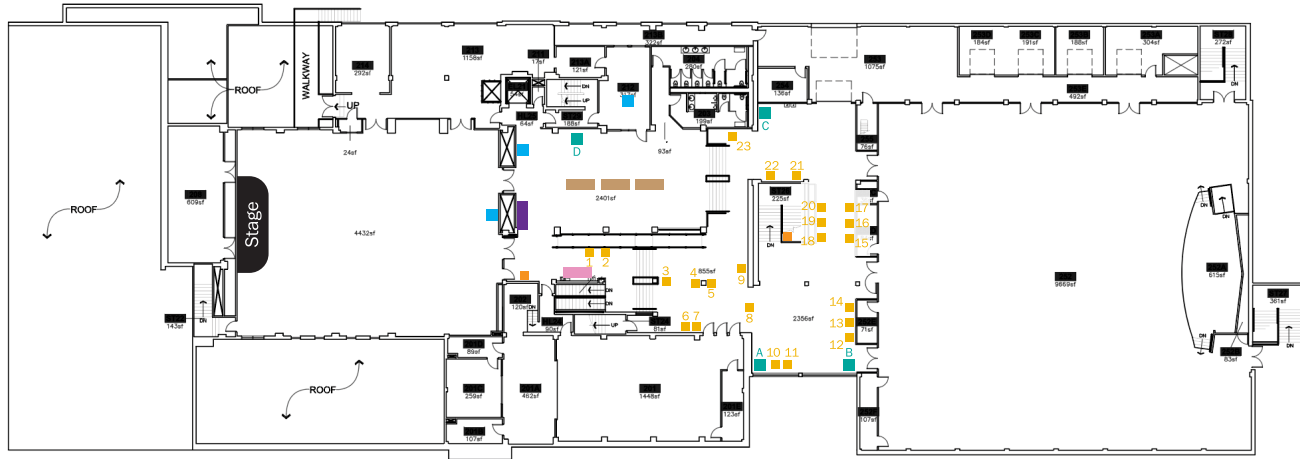# Bruce M. Pitman Center
2nd Floor

CATERING
- Drink Station
- Catering Table

POSTERS
- Traditional
- Digital

OTHER
- IBEST Poster
- Registration Table
- Promo Table

Guest Wireless

The University of Idaho offers visiting parents and scholars a campus-wide wireless network that is specifically designed for temporary visitors called AirVandalGuest.

AirVandalGuest limitations
AIrVandalGuest is a slower speed connection. Basic web work and common network services such as checking email, web browsing and light video streaming will still be functional. If you need extra bandwidth while visiting on campus. please contact the ITS Help Desk to explore your options.

Security violations
Because the guest network does not require registration, any cases of copyright abuse, infection, or other security violations will result in the machine being immediately disconnected. If your guest machine is unexpectedly disconnected from this network, please contact the ITS Help Desk for assistance in determining the cause.

How to connect to AirVandalGuest
AirVandalGuest uses a preshared password, which can be used to connect to the wireless network. The network requires no device registration, but because of this it has the limitations listed above. To connect, open your device's

wireless network connections and connect to AirVandalGuest, entering the password GoVandals!

1) Open your computer's wireless internet networks and select AirVandalGuest from the list.
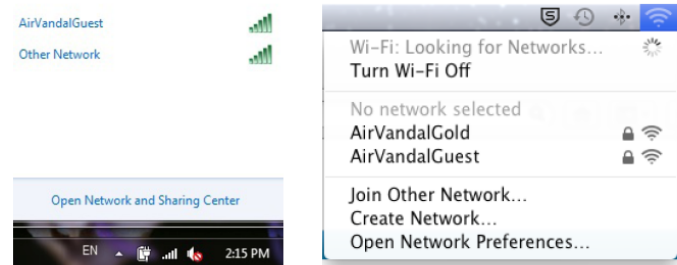
2) Connect to **AirVandalGuest**. When prompted, enter the preshared key password **GoVandals!**(capital G, capital V, exclamation point at the end).

3) You will be connected to AirVandalGuest. Please note the limitations that apply to this network at the top of the page.

If you have any questions about the AirVandalGuest network, please contact the ITS Help Desk via email at **helpdesk@uidaho.edu**, by phone at **208-885-HELP** or in person at our main office in the **Idaho Commons building, TLC room 128**.

THANK YOU FOR
ATTENDING!

ibest

Institute for Bioinformatics and Evolutionary Studies