

Matthew Baker

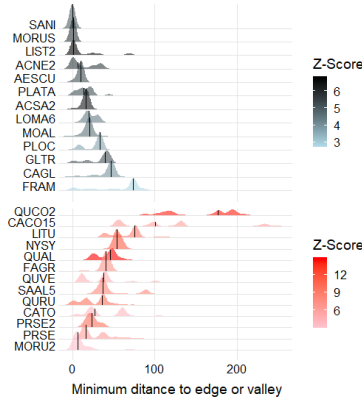
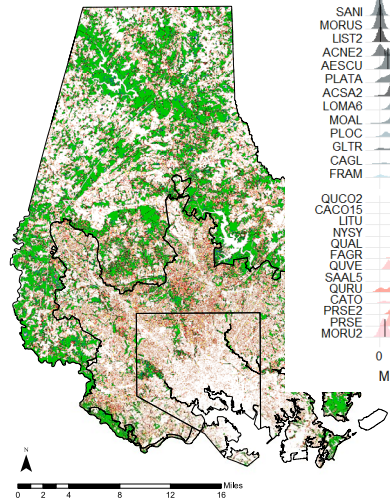
Professor, GES



Expertise:

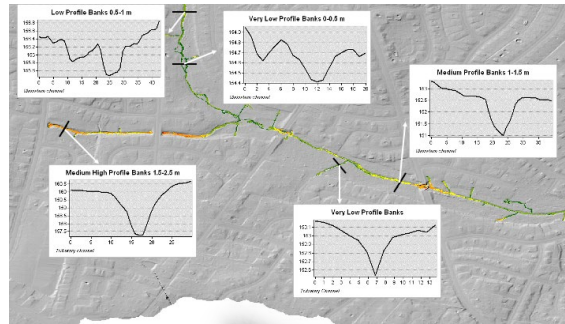
Stream Ecology, Forest Ecology, Landscape Ecology

Research focus:

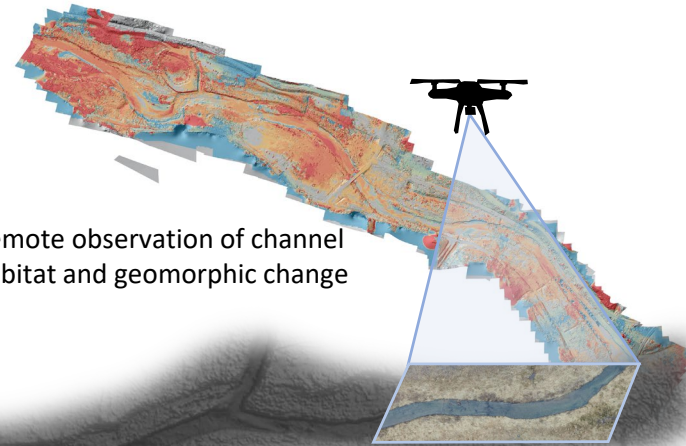


Edge-interior thresholds in woodland composition

High resolution channel mapping and patterns of incision



Remote observation of channel habitat and geomorphic change



Structure of Urban-Rural Woodlands

Keywords: terrain analysis, morphometric analysis, water quality, benthic macroinvertebrates tipping points, plant-soil relations, forest structure, flood modeling, hydrologic modeling

Tools: GIS/RS, UAVs, TLS, FLIR, dendro bands, structure-from-motion, TITAN, causal modeling

Matthew Baker

Professor, GES

Select current projects:

- Hydrographic densification across the Chesapeake Bay watershed (Chesapeake Bay Program)
- Biodiversity, structural, and functional characteristics of forest patches along urban land use gradients (in partnership with Baltimore Greenspace, USFS, Baltimore Ecosystem Study)
- Long-term change in urban forests: the ForestGEO network (Smithsonian Institution)
- Threshold Indicator Taxa ANalysis (TITAN): download R package from CRAN [here](#)
- Identification and quantification of channel incision across watersheds (Baltimore Ecosystem Study)
- Geomorphic effects of dam removal on the Patapsco River (American Rivers, NOAA)

Future ICARE-based projects may deal with...

- Role of habitat complexity in stream restorations
- Effects of riparian buffers in agricultural landscapes
- Urban tree growth and photosynthesis under heat stress
- Urban heat islands

For more information: [Laboratory Website](#); [Google Scholar](#)

Dawn Biehler

Associate Professor, Geography and Environmental Systems

Expertise: environmental justice, urban geography, health geography

Research focus:



Tire drive/clean-up



Community-based vacant lot garden

Keywords: environmental justice, urban environmental history, intersectional environmentalism, feminist geography, human-animal relationships, urban green/open space, housing justice

Tools: community photography, interviews, archival research, public participation research

Dawn Biehler

Associate Professor, Geography and Environmental Systems

Select current projects:

- NSF CNH: Urban disamenities and pests: Coupled dynamics of urban mosquito ecology and human activities across socio-economically diverse communities
- Book project, University of Washington Press: *Wild Lives in the City: Belonging and Being in Central Park's Urban Nature*
- Student project: Analysis of Environmental Migrants' Mental Wellbeing in Maryland
- Student project: Decades of Drugs and Terror: An Analysis of the Racialized Opioid Epidemic in Baltimore City

Future ICARE-based projects may deal with...

- Public participation and role of urban activists in planning for health effects of climate change
- Effects of urban green space on diverse human communities and wildlife
- Social, environmental, and racial justice in waste disposal in Baltimore
- Environmental history of segregation in Baltimore

For more information: <https://ges.umbc.edu/dawn-biehler/>

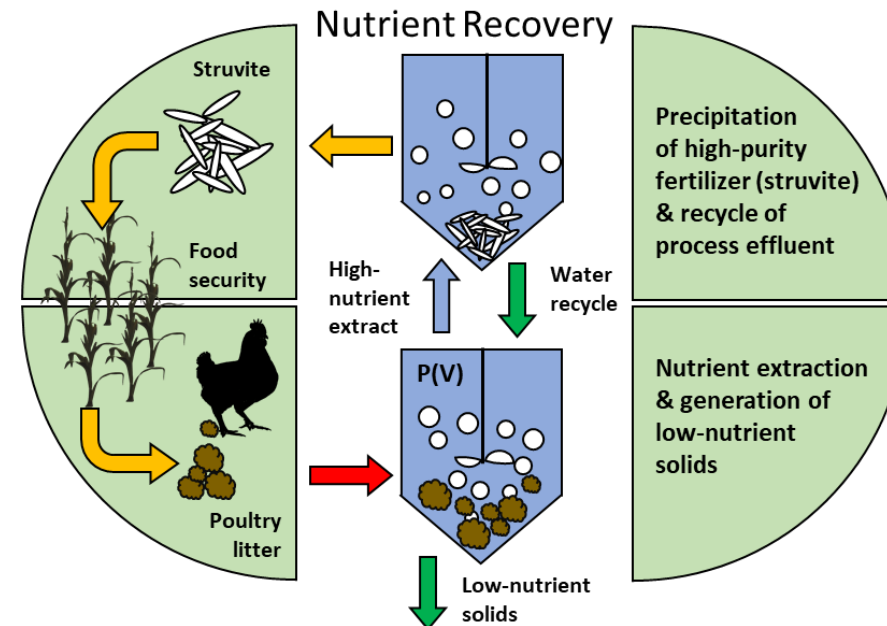
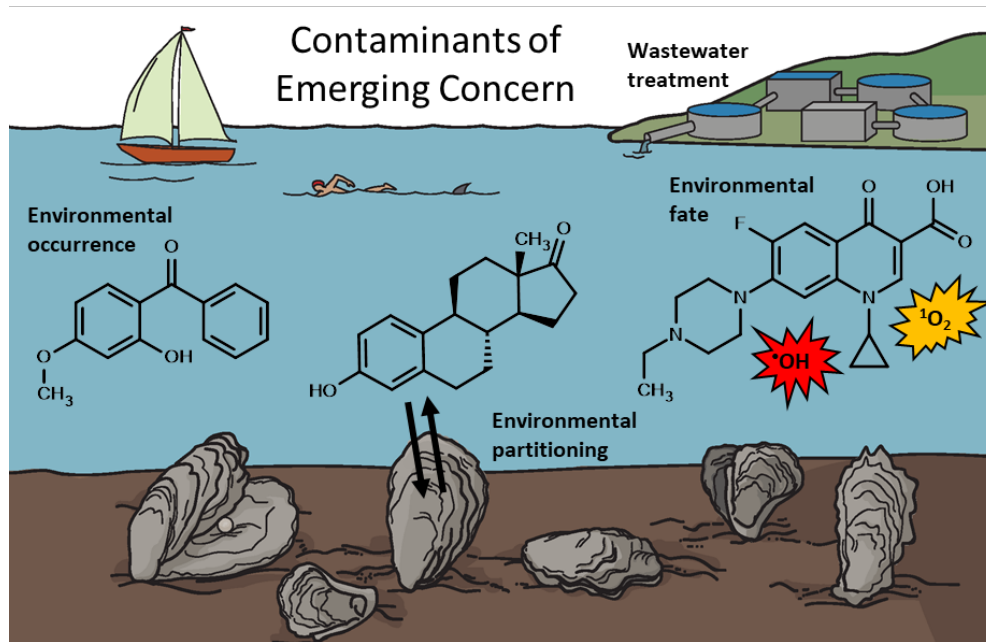
Lee Blaney

Associate Professor, CBEE



Expertise: Environmental engineering; environmental chemistry

Research focus:



Keywords: water quality; water/wastewater treatment; environmental chemistry; sustainability; circular economy; analytical chemistry

Tools: liquid chromatography with triple quadrupole tandem mass spectrometry; high-performance liquid chromatography; fluorescence spectrometer; ion chromatography; total organic carbon analyzer; water quality modeling; nutrient analysis

Lee Blaney

Associate Professor, CBEE

Select current projects:

Occurrence, fate, and toxicity of contaminants of emerging concern (CECs)

- [NSF CBET 1653726](#) – CAREER: Environmental forensics: Emerging water quality tools to detect leaking sewers in urban streams
- [NSF CBET 1510420](#) – UNS: Class-specific transformations of antibiotics in UV-based water/wastewater treatment processes
- [SERDP ER20-1073](#) – Ion exchange membranes and fibers as passive samplers for chemically-diverse PFAS

Turning waste into a resource – nutrient recovery

- [NSF CBET 1706819](#) – INFEWS N/P/H₂O: Development of sustainable Nutrient Extraction and Recovery Devices (NERDs) for municipal and agricultural wastewater
- USDA AFRI 1022113 – Sustainable Donnan dialysis process for simultaneous recovery of nutrients from pig manure and treatment of brackish groundwater for irrigation

Future ICARE-based projects may deal with...

- The occurrence of CECs, such as pharmaceuticals and PFAS, in Baltimore Harbor
- Tracking leaking sewers in Baltimore City using emerging water quality tools
- Recovering nutrients from urine to produce fertilizers for use in urban gardens

For more information: [laboratory website](#); [Google scholar](#)

Mercedes Burns

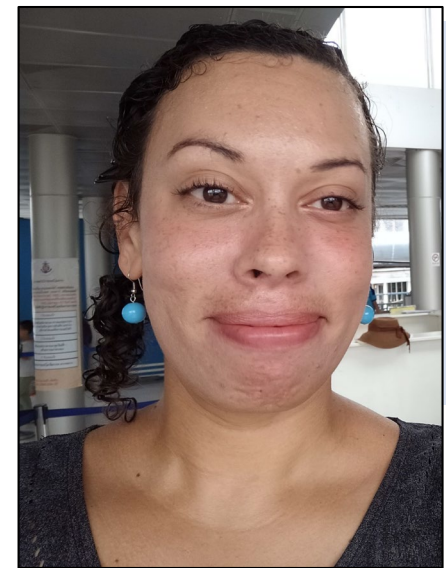
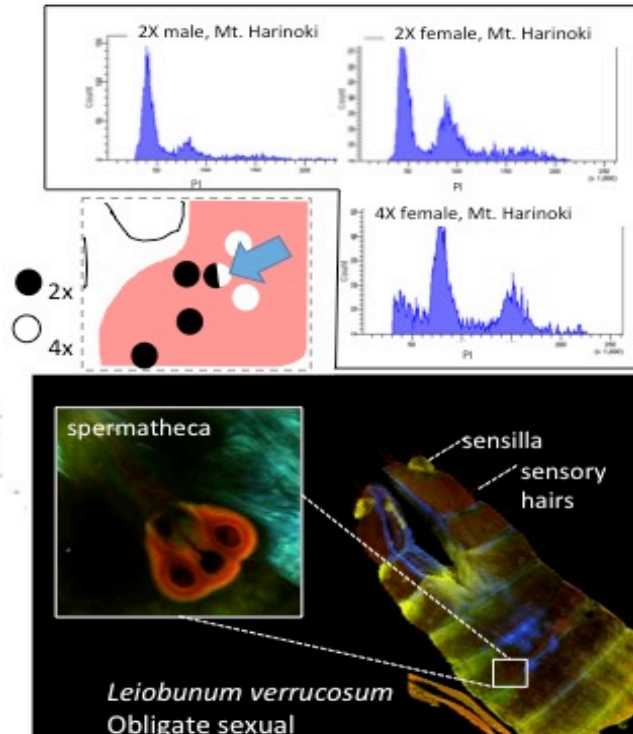
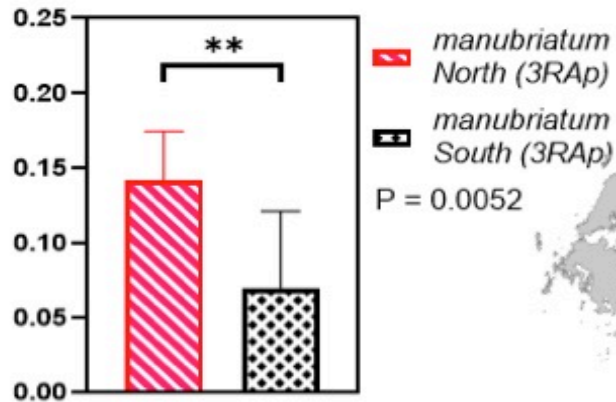
Assistant Professor, BIOL

Expertise: Population genomics, evolutionary ecology

Research focus:



Leioleptus manubriatum, Facultatively asexual



Keywords: Next-generation sequencing; phylogenetics; genotyping; sexual selection, reproduction

Tools: Dissection microscopy, PCR, gel electrophoresis, BluePippin fragment size selection, Qubit intercalating dye quantification, Oxford Nanopore sequencing, fluorescence spectrophotometry

Mercedes Burns

Assistant Professor, BIOL

Select current projects:

Whole genome sequencing of a facultative parthenogen

Genome evolution in diploid and tetraploid *Leiobunum manubriatum*

Ploidy transitional zones in *L. manubriatum*

Maintenance of sex in facultative parthenogens

Automated behavioral analysis of mating

Genetic analysis of mixed sexual/asexual offspring

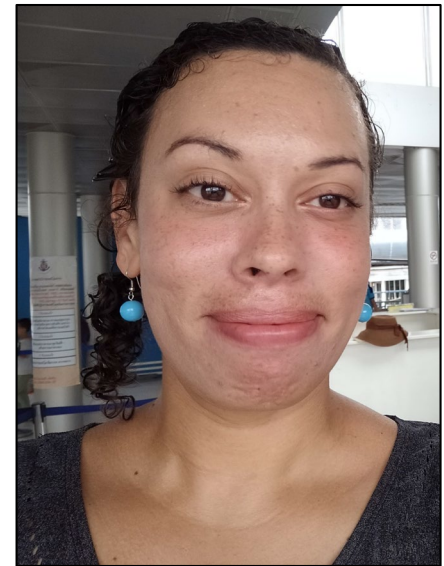
Spermathecal mechanisms in harvesters

Sperm precedence and maintenance by spermathecal morphology

Future ICARE-based projects may deal with...

- Population genetics of native/non-native species
- Metagenomics of Chesapeake-associated waterways
- Ecosystem services of insectivores

For more information: burns.umbc.edu



Kathleen Cusick

Assistant Professor, Biological Sciences



Expertise:

Marine molecular microbial ecology; harmful algal blooms

Research focus:



Keywords:

HAB genetic diversity; Paralytic Shellfish Toxins; bioluminescence; copper in coastal systems; mega-plasmids and horizontal gene transfer in marine microbes

Tools:

Applied Biosystems QuantStudio 6 Flex Real-time PCR Instrument; Invitrogen E-Gel Power Snap Electrophoresis System; Nanodrop 1C; Percival environmental chamber

Kathleen Cusick

Assistant Professor, Biological Sciences

Select current projects:

Harmful Algal Bloom Ecology (UMBC Internal Funding)

- Toxin Production in HAB Sub-populations – Genetics or Environment?
- Molecular and Ecophysiological Links between toxin production and bioluminescence

Copper Tolerance in Marine Microbes (UMBC Internal Funding)

- Molecular Mechanisms of Copper Resistance in *Alteromonas macleodii*
- Horizontal gene transfer as a driver of copper resistance in marine bacteria
- Effects of elevated copper on toxin production in HAB species

Future ICARE-based projects may deal with...

- Introduction and persistence of foreign microbes into coastal waters (Port of Baltimore/Baltimore Harbor) via commercial vessels
- Links between copper and antibiotic resistance in coastal marine bacteria
- Genomic and transcriptomic characterization of early microbial colonizers of copper-treated marine vessels

For more information: <https://biology.umbc.edu/directory/faculty/person/MG49731/>

Pubmed citations:

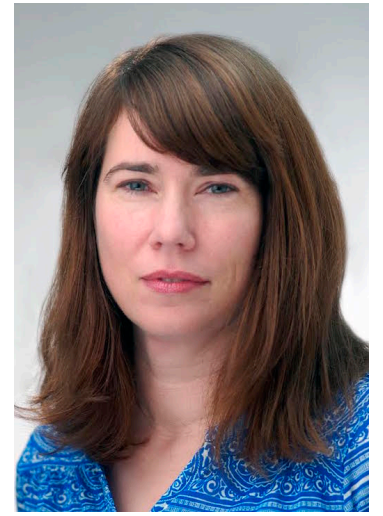
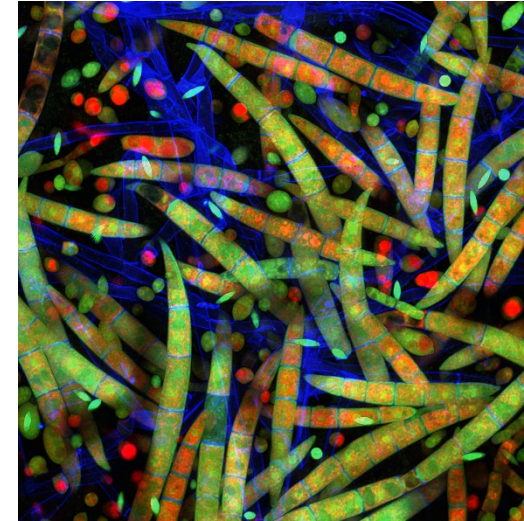
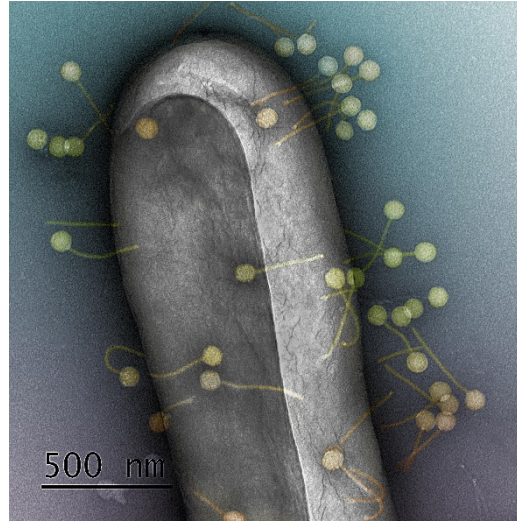
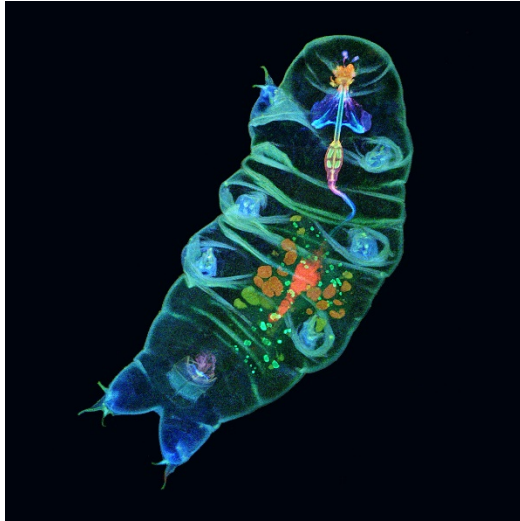
<https://www.ncbi.nlm.nih.gov/myncbi/1FICacYu8KIAB/bibliography/public/>

Tagide deCarvalho

Keith R. Porter Imaging Facility, Director
Research Assistant Professor, CNMS

Expertise: Microscopy and Imaging; Neuroscience; Behavioral Ecology

Research focus:



Keywords: Cell biology; virology; histology; microbiology; nanotechnology

Tools: Optical microscopy; confocal microscopy; transmission electron microscopy (TEM); scanning electron microscopy (SEM) with elemental analysis (EDS); flow cytometry; 3D printing; immunofluorescence; *in situ* hybridization

For more information: [Core facility website](#); [Google scholar](#)

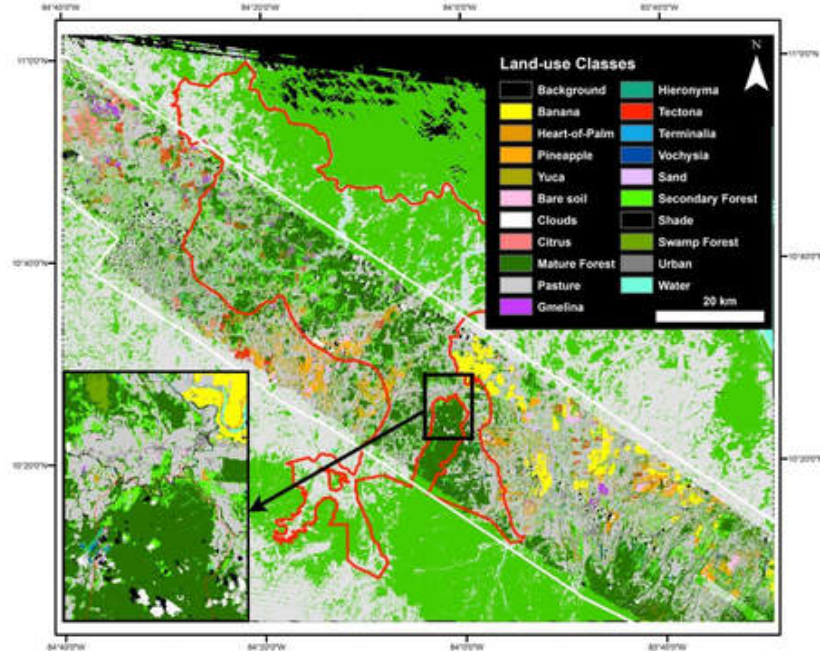
Matthew Fagan

Assistant Professor, GES



Expertise: Landscape ecology, remote sensing/GIS

Research focus:



Innovative maps
of forests and
plantations...



To improve
conservation and
landscape ecology

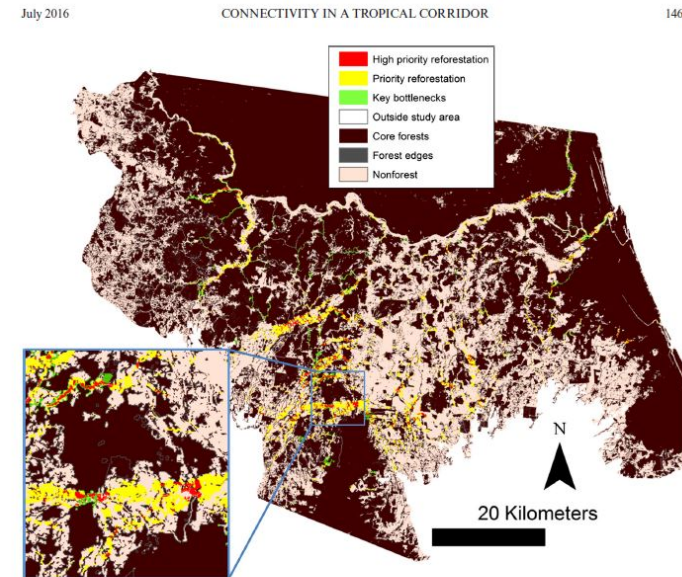


FIG. 7. Map of priority reforestation areas and key bottlenecks to functional connectivity in northeastern Costa Rica. Core forests are shown in dark brown, with core forest edges in dark gray. The inset shows priority reforestation areas and key bottlenecks just northeast of La Selva Biological Station.

Keywords: conservation science, connectivity, fragmentation, forest ecology, habitat restoration, tree plantations, human-dominated landscapes, sustainability.

Tools: High-performance desktop computers with distributed storage; GIS and remote sensing software, bioacoustic recorders and processing software, GPS units and forest mensuration equipment

Matthew Fagan

Assistant Professor, GES

Select current projects:

Monitoring Restoration of Fragmented Landscapes

- Expansion of tropical tree plantations across the global tropics (internal UMBC funding)
- Improving global estimates of tree cover: a case study in Costa Rica (internal UMBC funding)

Assessing Conservation in Tropical Landscapes

- [NSF IRES 1827110](#) – International Research in The Bahamas: Conservation Biology of the Critically Endangered Bahama Oriole

Examining forest ecology in three dimensions

- Fragmentation and edge effects in industrial forest landscapes (internal UMBC funding)

Future ICARE-based projects may deal with...

- Forest connectivity changes in the Mesoamerican Biological Corridor in response to conservation policies and migration
- Predicting edge effects along riparian forests in Maryland and Costa Rica
- Assessing natural forest loss rates in industrial tree plantation landscapes.

For more information: [Laboratory website](#); [Google scholar](#)

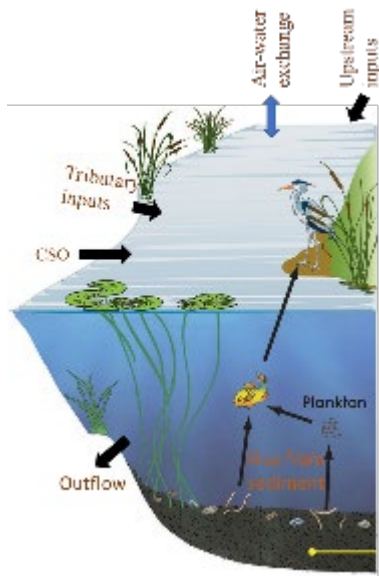
Upal Ghosh

Professor, Chemical Biochemical & Environmental Engr



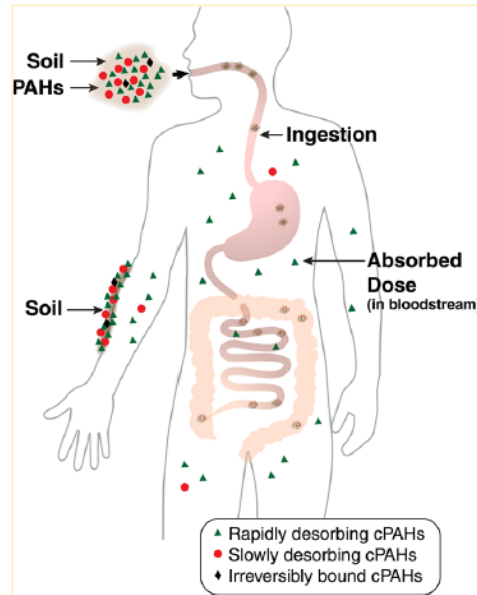
Expertise: [Environmental Engr; pollutant transport, remediation]

Research focus:



Ghosh et al. ES&T 2011

- Fate and Transport
 - Transformation
 - Bioavailability
 - Ecosystem exposure
-
- Human exposure
 - Thermodynamic & kinetic models
 - Risk assessment



Ruby et al. ES&T 2016

Novel technologies for remediation

Engineering scaleup and translation to field



Beckingham & Ghosh ES&T 2011

Keywords: [pollutant fate/transport in the environment; measurement & modeling of uptake in food webs, risk assessment, development & implementation of novel remediation technologies]

Tools: [Gas chromatographs, mass spectrometers, carbon analyzers, field sites for large-scale experiments, laboratory setup for physical simulations of the environment]

Upal Ghosh

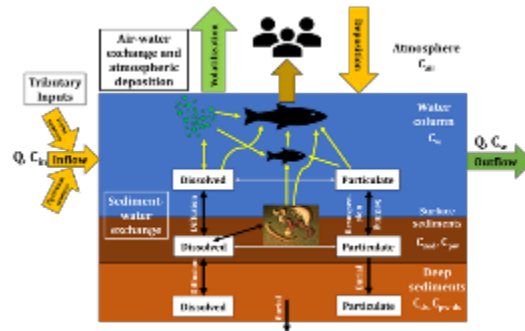
Professor, Chemical Biochemical & Environmental Engr

Select current projects:

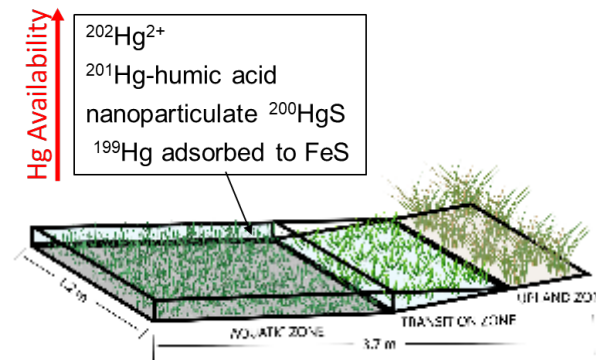
Monitoring pollutant loads for source identification (City and Counties, MDE)



Mass balance and food web modeling for Anacostia River (DOEE)



Mercury biogeochemistry, measurements, and remediation (NIH)



Development of novel passive sampling approaches for PCBs, dioxins, mercury, PFAS (Multiple projects- DoD)

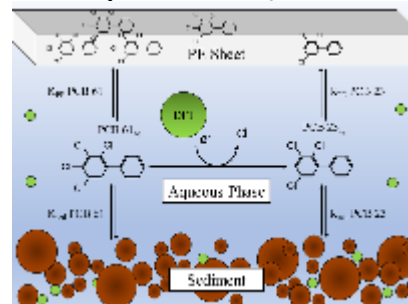


Future ICARE-based projects may deal with...

Sustainable management of sediments (Port Administration)



Development of novel bioremediation technologies for chlorinated compounds (NIH/DoD)



Evaluation of remediation technology in the field (PEPCO)



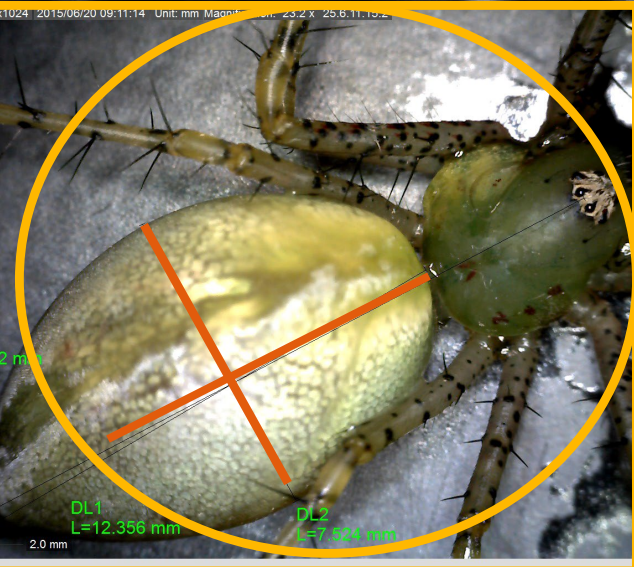
For more information: [<https://userpages.umbc.edu/~ughosh/>] [[Google Scholar link](#)]

Chris Hawn

Assistant Professor, Geography and Environmental Systems

Expertise: Urban ecology, Arachnology, Public Science

Spiders are what they eat. If prey carry toxins from their environment, we can detect these contaminants in spider bodies.



Our work has shown that the quality of our environment is reflected in the bodies of spiders. We measure the spider body condition in different habitats to evaluate their habitat quality.



Air pollution eventually settles as dust, entering our lungs, homes, and lives. We measure air pollution with public scientists who collect spider webs. The webs are as good as air sensors at collecting contaminated dust that we can analyze in the lab.

Community-led
spider web
air quality
measurements



The role of urban gardens in providing a network of habitats for pollinators



Poten

For more information:
laboratory website



The movement of contaminants from Baltimore Harbor to terrestrial habitats



The effects of pharmaceuticals in streams on spider web-building behavior

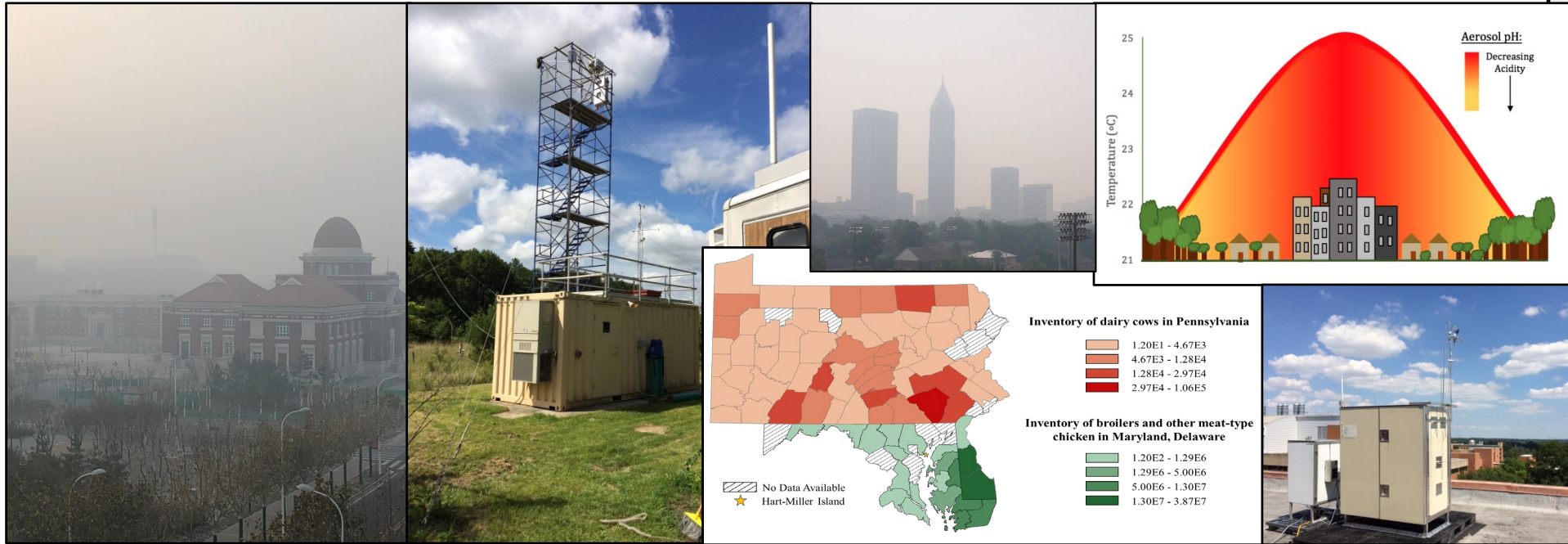
Chris Hennigan

Associate Professor, CBEE



Expertise: Atmospheric chemistry, Environmental engineering

Research focus:



Keywords: urban air quality; aerosols; air pollution; particulate matter; analytical chemistry; emissions

Tools: Particle-into Liquid Sampler (PILS); ion chromatography; total organic carbon analyzer; OCEC (on line) analyzer; AiRRmonia gas-phase NH_3 analyzer; inductively coupled plasma-mass spectrometer; liquid waveguide capillary cell for long-path UV measurements; aerosol thermodynamic modeling

Chris Hennigan

Associate Professor, CBEE

Select current projects:

- [NSF CHE 1454763](#) – CAREER: Characterizing Acid-Catalyzed Secondary Organic Aerosol Formation in the Atmosphere
- [NSF AGS 1719252](#) – Collaborative Research: Effects of Ammonia on the Chemical and Physical Properties of Atmospheric Secondary Organic Aerosol
- [NSF CBET 1802474](#) – A Novel Approach to Characterize the Speciation and Toxicity of Metals in Atmospheric Particulate Matter
- [NIH 1U01EB021952-01](#) – A wearable asthma trigger monitoring system with integrated physiological monitor

Future ICARE-based projects may deal with...

- Development of a low-cost method to measure atmospheric ammonia (NH₃); agricultural emissions and effects on urban air quality
- Secondary organic aerosol formation in the eastern United States
- Chemical transformations of atmospheric organic compounds in cloud water

For more information: <https://scholar.google.com/citations?user=pJCpTcoAAAAJ&hl=en>

Maggie Holland

Associate Professor, Dept of Geography & Env Systems

Expertise: environmental policy & management impacts ;
social dimensions of conservation action

Research focus:



Surveys at Balt City farmers' market



Class consultancy with Real Food Farm, Baltimore City



Participatory mapping with farmers in Ecuadorian Amazon

Keywords: forest conservation ; sustainable agriculture ; climate adaptation; community engagement ;
land tenure security and impacts on changing land use

Tools: geospatial analysis ; participatory mapping ; household surveys ; focus groups ; interviews ;
mixed methods in social science

Maggie Holland

Associate Professor, GES

Select current projects:

- Land tenure and forest patches: a comparative analysis of ownership and management of forest patches in Baltimore City and Baltimore County
- Machambas in Maputo: urban farmers, the land, and shifting use of informal spaces in a rapidly changing African city
- Impact of payments for ecosystem services program on slowing deforestation and increasing land tenure security in Ecuador

Future ICARE-based projects may deal with...

- Community-based conservation efforts tied to urban trees, water, and wetlands
- Management of urban forests
- Explore impacts of climate change initiatives as tied to neighborhood and community outcomes
- Urban farming and food security

For more information: [department website](#) ; [personal website](#) ; [Google Scholar](#)

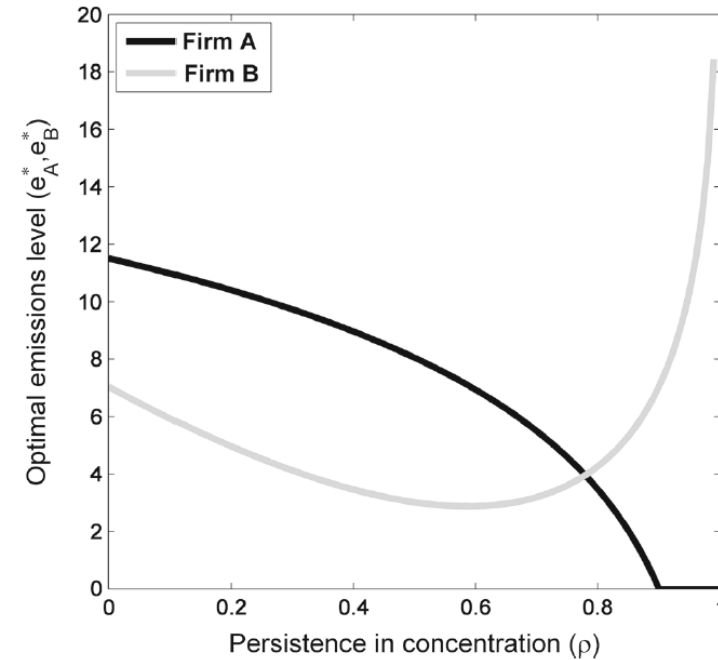
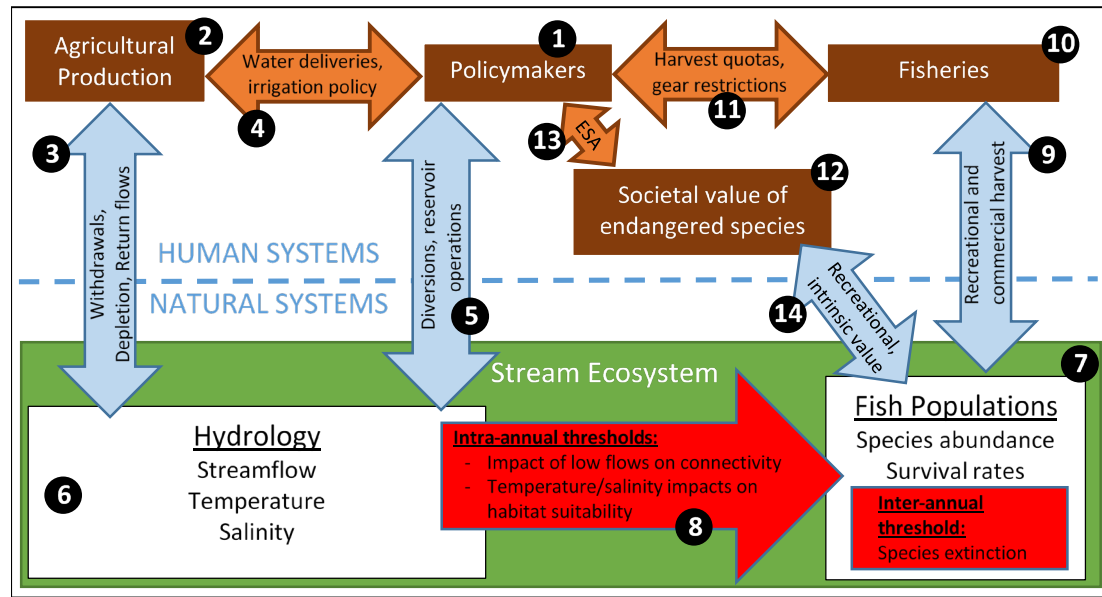
Yusuke Kuwayama

Assistant Professor, School of Public Policy



Expertise: Environmental and natural resource economics

Research focus:



Keywords: Water resource management; Agricultural water use; Ecosystem uses of water; Water quality; Integrated socio-environmental systems; Science and society

Tools: Applied microeconomic theory; Dynamic optimization; Applied econometrics; Statistical software packages (Stata, R); Numerical computing environments (MATLAB, R)

Yusuke Kuwayama

Assistant Professor, School of Public Policy

Select current projects:

- [Advancing Integrated Process-Based Modeling of Complex Socio-Environmental Systems](#): Integrating models across ecology, economics, and hydrology to derive general principles and heuristic approaches for management of connected groundwater-surface water systems. Supported by [SESYNC](#).
- [Consortium for the Valuation of Applications Benefits Linked with Earth Science \(VALUABLES\)](#): Collaborating with the Earth science community to quantify and communicate how satellite information benefits people and the environment when we use it to make decisions. Supported by [NASA](#).
- Estimating the economic benefits of ambient water quality improvements: Using socioeconomic data and statistical analysis to estimate the value of improved water quality for recreational and local amenity uses.

Future ICARE-based projects may deal with...

- Estimating the socioeconomic benefits of water quality improvements in Baltimore Harbor
- Assessing the impact of water management policies on marine and freshwater ecosystems near Baltimore City

For more information: [UMBC website](#); [Personal website](#); [Google Scholar](#)

Jeff Leips

Professor, Department of Biological Sciences

Expertise: Quantitative genetics, evolution and ecology

Research focus: The evolution and genetics of life history traits



Keywords: Ecological genetics, host parasitoid interactions, genetics of aging

Tools: Temperature controlled facilities, microscopy, microinjection, genomics



Jeff Leips

Professor, Biological Sciences

Select current projects:

The genomic basis of age-specific declines in immunity

Genetic variation in epigenetic regulation of age-specific decline in fitness traits

Future ICARE-based projects may deal with...

- The genetic basis of local adaptation to urban stressors
- The role of species interactions in shaping life history strategies

For more information: <https://leiplab.umbc.edu/>,

<https://scholar.google.com/citations?user=Qkm1qZ0AAAAJ&hl=en>

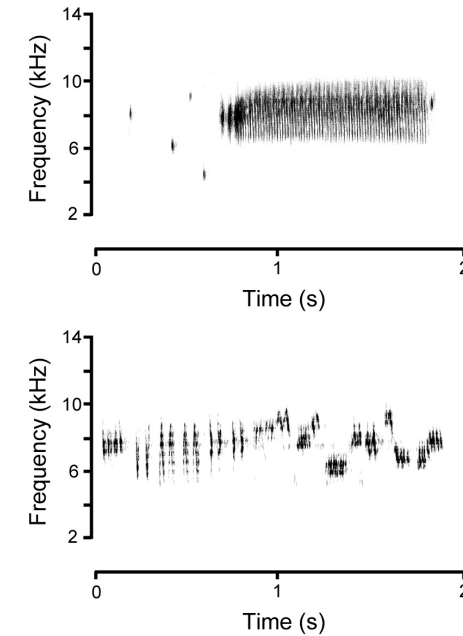
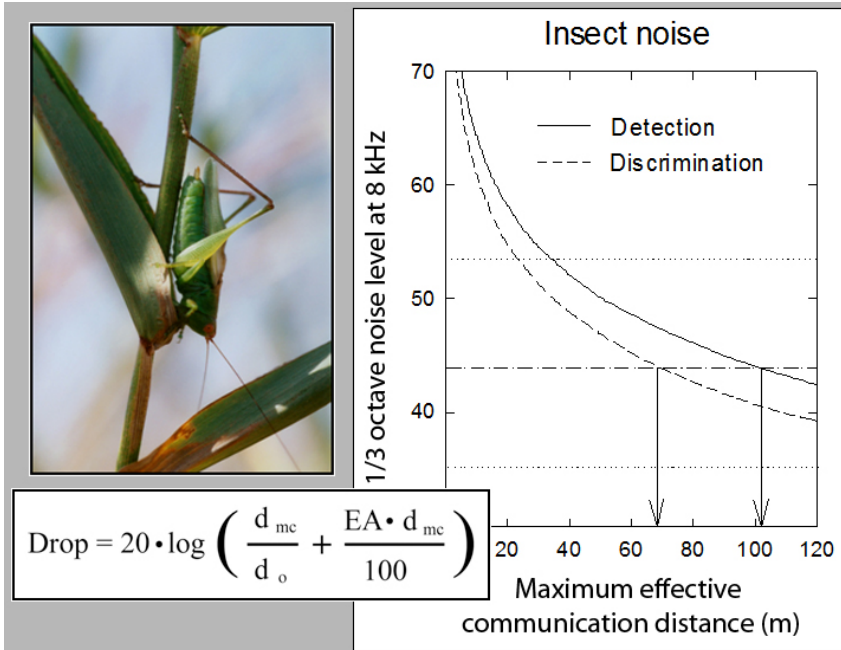
Bernard Lohr

Associate Professor, Biological Sciences



Expertise: Sensory ecology; animal bioacoustics; conservation behavior

Research focus:



Keywords: animal behavior; behavioral ecology; acoustic communication; noise; auditory masking; comparative hearing biology; habitat bioacoustics, psychoacoustics, active space

Tools: acoustic analysis, autonomous audio recording, noise measurements, playback experiments, operant conditioning, song choice experiments, vocal development studies, captive breeding

Bernard Lohr

Associate Professor, Biological Sciences

Select current projects:

The active space of acoustic signals

- Acoustic communication and auditory masking: estimating the active space of auditory signals in the Baltimore harbor and other urban environments
- Sexual selection and birdsong: understanding the role of genetics and culture in song production and perception

Conservation efforts in declining bird populations

- USFWS F12AP01102: Captive Breeding of Grasshopper Sparrows (*A. s. pratensis*) as a precursor to conservation efforts with the Florida Grasshopper Sparrow (*A. s. floridanus*)
- Examining song cultures and song stereotypy in Caribbean populations of the Grasshopper Sparrow (currently four subspecies on different islands)
- Relationship of spatial use and social structure to communication events during the breeding cycle of small songbirds

Future ICARE-based projects may deal with...

- Noise-related acoustic communication issues for urban birds and other wildlife
- Impact of endocrine disruptors on song development in birds
- Relationship of behavior to conservation efforts with birds and other vertebrates

For more information:

[https://biology.umbc.edu/directory/faculty/person/WP05933/;](https://biology.umbc.edu/directory/faculty/person/WP05933/)

<https://scholar.google.com/citations?user=lekcMzwAAAAJ&hl=en>

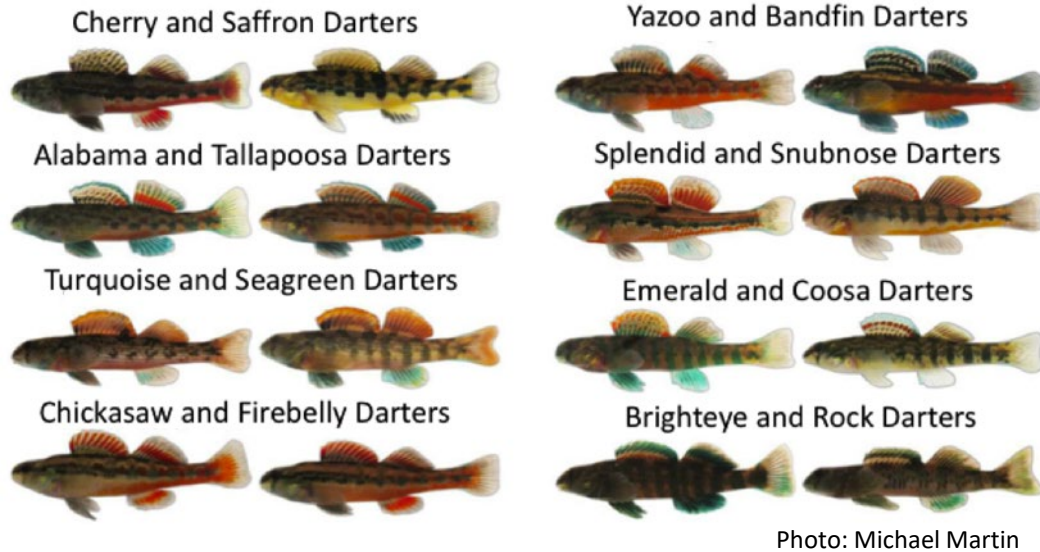
Tamra Mendelson

Professor, Biological Sciences



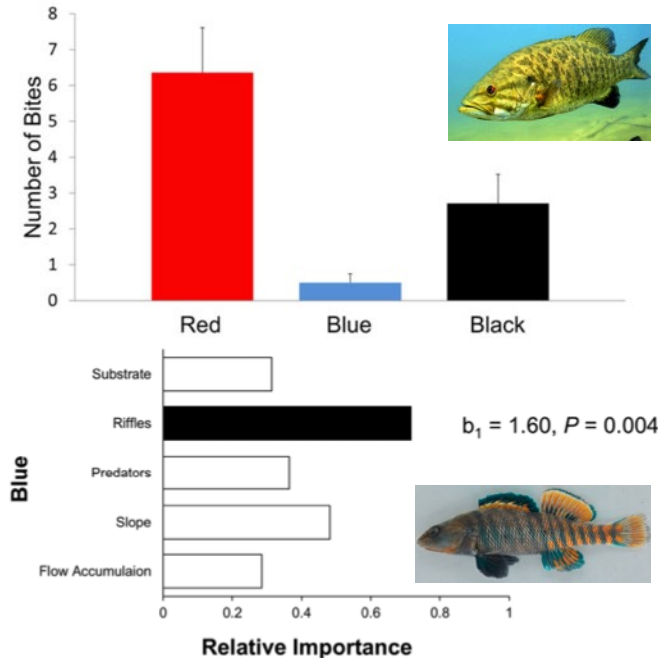
Expertise: evolution, animal behavior

Research focus:



Keywords: evolution, speciation, reproductive isolation, visual ecology, behavior, stream fish, habitat choice, mate choice

Tools: animal behavioral assays, fish collection and surveys, stream habitat quantification, spectrophotometry, video playback, computer animations, phylogenetics



Largemouth bass preferentially attack red lures

Habitat type predicts coloration in darter fish

Tamra Mendelson

Professor, Biological Sciences

Select current projects:

NSF IOS-1708543 “Efficient coding and the evolution of animal signals”

NSF IOS-0919271 "The accumulation of reproductive isolation in a diverse genus of fish (Percidae: Etheostoma)"

Future ICARE-based projects may deal with...

- Distribution of freshwater fish populations throughout the Baltimore Harbor catchment
- Stream restoration and health
- Impact of pollutants on freshwater fish

For more information: www.mendelsonlab.net

<https://scholar.google.com/citations?user=Yi2V67cAAAAJ&hl=en&oi=ao>

Andrew J. Miller

Professor, GES



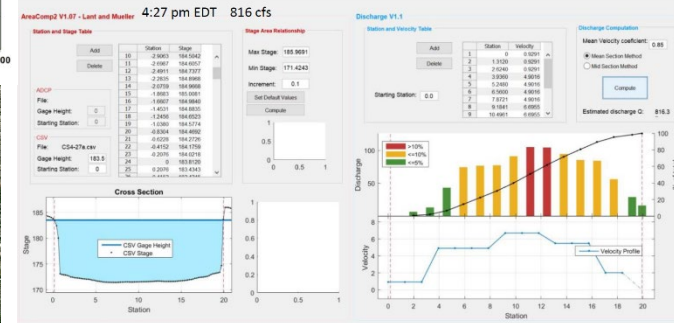
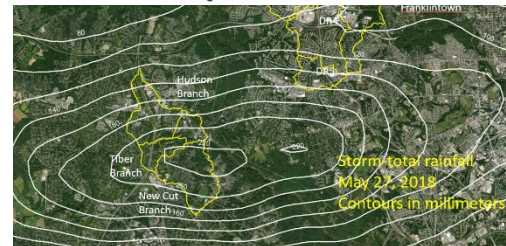
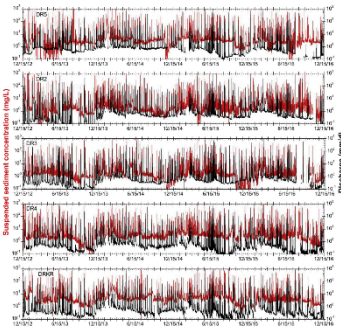
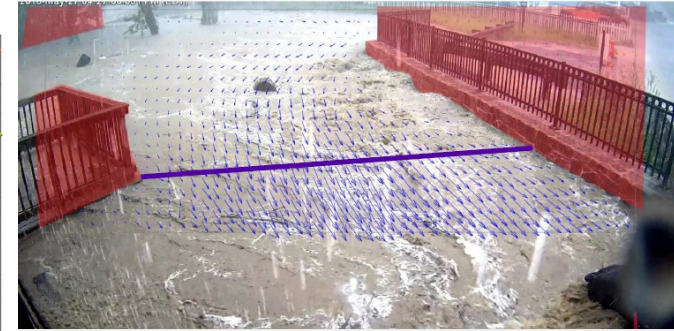
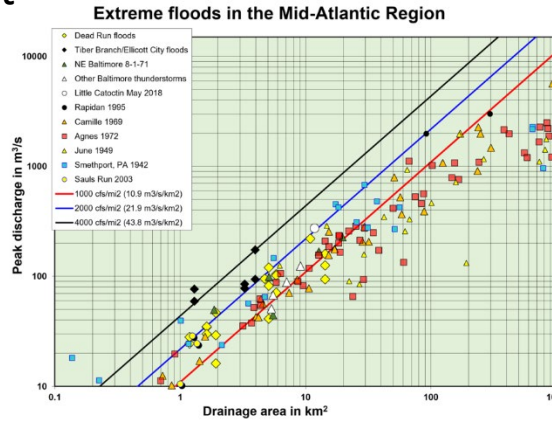
Expertise:

Hydrology, watershed science, urban environment

Research focus:

Watershed restoration, fate and transport of sediment

Flood hydrology and hydraulics, extreme rainfall



Keywords:

flood hydrology and hydraulics, fate and transport of sediment, effectiveness of stream restoration and stormwater mitigation, climate change and urban flood hazards

Tools:

2-d hydraulic modeling of flood flow, Structure from Motion and LiDAR for high-resolution topography and landform change analysis, Particle Image Velocimetry

Andrew J. Miller

Professor, GES

Select current projects:

Flood hydrology of urban watersheds

- NSF SRN: Urban Water Innovation Network B2b – Hydrology and hydraulics of urban floodplains.
- Maryland Water Resources Research Center: Application of Particle Image Velocimetry and Structure from Motion to reconstruct discharge hydrographs for an extreme urban flood
- Analysis of HydroNEXRAD and Dual Polar Radar rainfall records to look for climate change signals

Fate and transport of sediment in the landscape, effectiveness of urban stream restoration and stormwater mitigation

- American Rivers: Tracking sediment migration and channel geomorphic evolution in response to Sept. 2018 removal of Bloede Dam
- Chesapeake Bay Trust: Effectiveness of stormwater management practices in protecting stream channel stability
- Chesapeake Bay Trust: Assessment of effectiveness of stream restoration on nitrate loads in nested urban watersheds

Future ICARE-based projects may deal with...

- Comparative analysis of urban watershed sediment yields
- Use of Particle Image Velocimetry with hand-held video clips for urban flood reconstruction
- Sensitivity of urban watershed flood response to climate trends in extreme rainfall

For more information: ges.umbc.edu/miller

Kevin Omland

Professor, Biological Sciences

Expertise: Avian evolution, ecology and conservation

Research focus:



Keywords: bird ecology, evolution, animal behavior, population genetics, diversity and inclusion

Tools: avian sound recording, molecular ecology approaches, banding and tracking – Cellular Tracking Technology

Kevin Omland

Professor, Biological Sciences

Select current projects:

- Evolution of female song including work in Eastern Bluebirds, Orchard Orioles and Bahama Orioles
- Conservation Biology of the critically endangered Bahama Oriole. Andros, Bahamas.
- International Research Experience In the Bahamas - National Science Foundation Funded –RES Project:
https://www.nsf.gov/awardsearch/showAward?AWD_ID=1827110&HistoricalAwards=false

Future ICARE-based projects may deal with...

- Impact of sea level rise, climate change, stormwater management on avian populations around the Baltimore Harbor
- Comparison of avian populations around the Baltimore Harbor to populations in other parts of the Chesapeake Bay
- Impact of artificial habitats including floating islands, stormwater management, public parks on bird populations

For more information: <https://omlandlab.umbc.edu/>

<https://scholar.google.com/citations?user=YScFVlwAAAAJ&hl=en>

Brian Reed

Professor, CBEE

Expertise: Environmental physicochemical processes
Metal interactions/toxicity with airborne particulate matter

Scaling Pilot-Scale Results to Full-Scale Systems

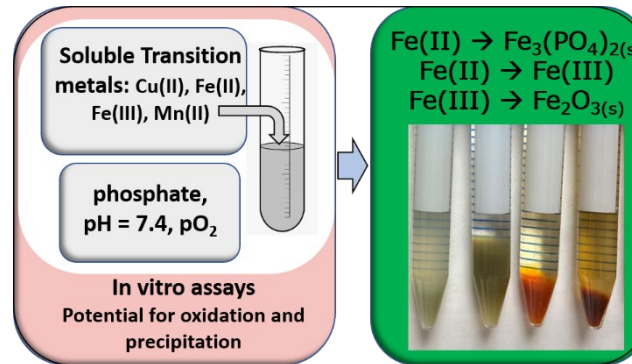


- PO_4 removal from RO reject Water by Fe-oxide adsorption-membrane process
- Nitrification rates for enhanced nutrient removal up grade
- Metal working fluid treatment using UF



Metal Toxicity and Fate in *In Vitro* Assays

- Transition metals can produce reactive oxygen species
- *In vitro* assays are used to estimate toxicity
- Fate of metals in these assays is unknown



Keywords: Water/wastewater treatment; environmental inorganic chemistry; pilot-scale treatability studies, membrane processes

Tools: Inductive coupled plasma-mass spectrometer; gas and liquid chromatography, automatic titrator, various bench-scale process apparatuses

Brian Reed

Professor, CBEE

Select current projects:

"A Novel Approach to Characterize the Speciation and Toxicity of Metals in Atmospheric Particulate Matter," Grant (Funded), Hennigan, Christopher J (Principal), Reed, Brian E (Co-Principal), Sponsored by National Science Foundation.

"Elucidating metal toxicity in particulate matter exposure: addressing artifacts in cellular and acellular assays", Investigators: Dr. Christopher Hennigan (PI), Dr. Jennie Leach (Co-I), Dr. Brian Reed (Co-I), . *Health Effects Institute*, pending

Future ICARE-based projects may deal with...

- Modeling fate of transition metals in acellular and cellular assays
- Development of treatment technologies for the US Navy *Green the Fleet* effort

For more information: reedb@umbc.edu

Kevin Sowers

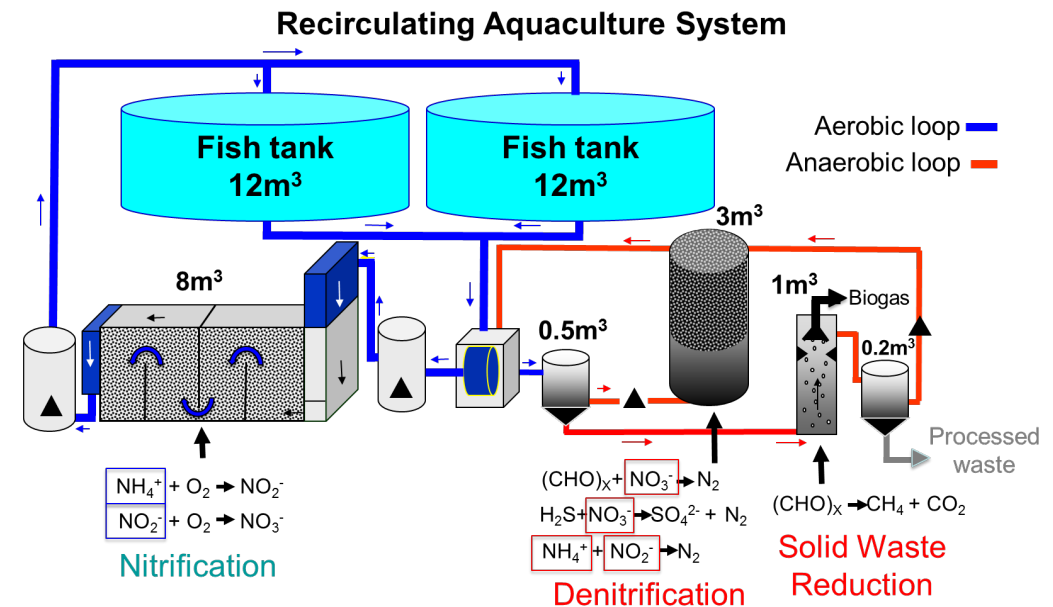
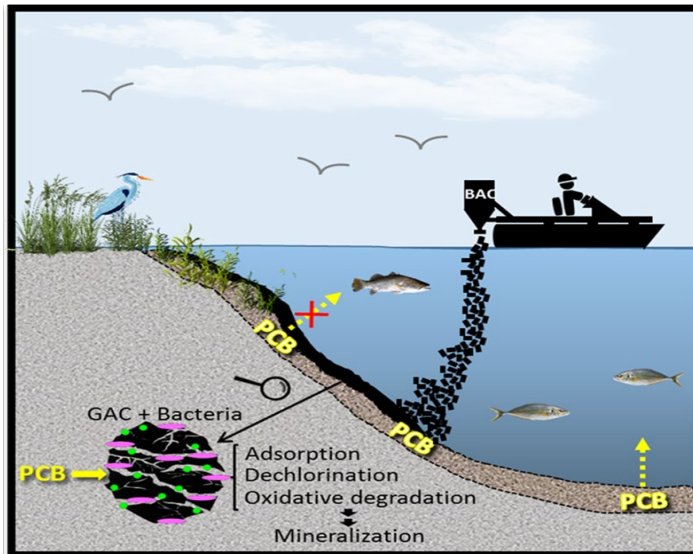
Professor, DMB



Expertise: Environmental/applied microbiology, molecular biology

Research focus:

Bioremediation of Polychlorinated Biphenyls



Keywords: bioremediation of organohalides; waste conversion to biomethane; sustainable aquaculture; microbial consortia

Tools: gas chromatography; accelerated solvent extraction; anaerobic glove boxes; anaerobic media prep station; real time PCR thermocycler; MiSeq next-gen DNA sequencing; vis/uv spectrophotometer; bench and pilot scale bioreactors; linear flow mesocosms

Kevin Sowers

Professor, DMB

Select current projects:

DOE - Redox biochemistry of energy conservation in methanogens and their syntrophic partners

NOAA - Building capacity of land-based Atlantic salmon aquaculture in the US

Future ICARE-based projects may deal with...

- Leveraging the chemo-physical interaction of halorespiring bacteria with solid surfaces to enhance halogenated organic compounds bioremediation
- Improving the Sustainability of Atlantic Salmon Marine RAS by Efficient Conversion of Its Solid Waste to Biomethane
- Quantifying biotic and abiotic reaction rates on the carbon surface to advance particulate AC mediated groundwater remediation
- Distribution, stabilization, and transformation of PFAS in biosolids-amended agricultural soils
- Developing a Toolbox for Assessing Polychlorinated Biphenyl Attenuation in Aquatic Sediments

For more information: <https://userpages.umbc.edu/~sowers/>;
<https://scholar.google.com/citations?user=zmksSmAAAAAJ&hl=en>

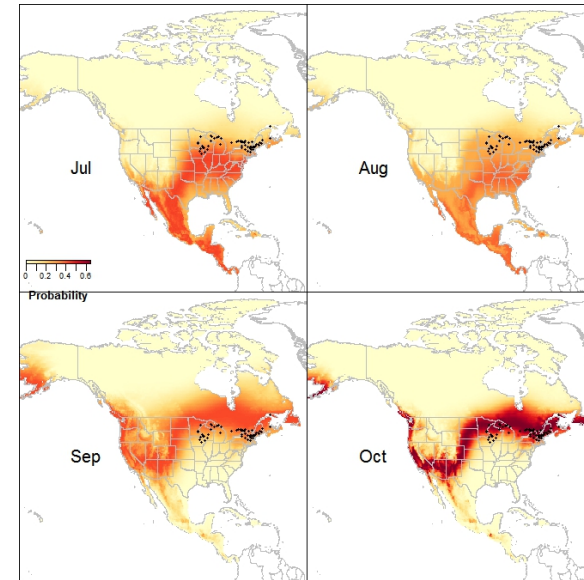
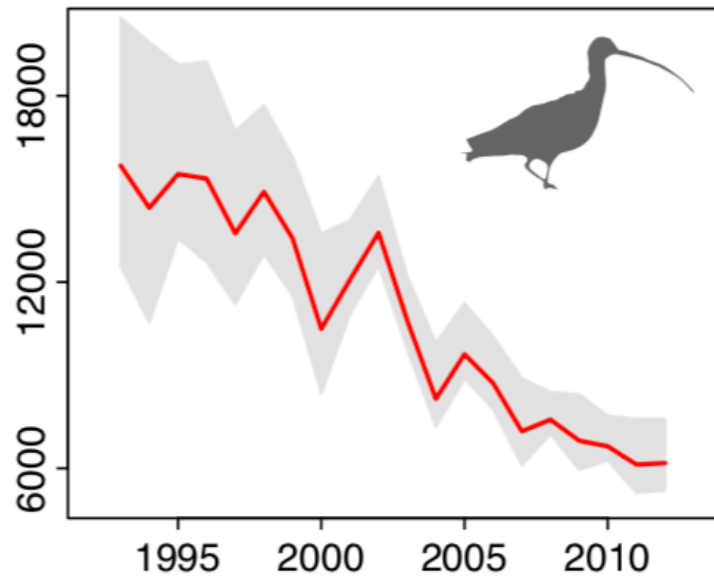
Colin Studds

Associate Professor, GES



Expertise: Animal Ecology, Conservation Biology

Research focus:



Keywords: animal movement; habitat occupancy; wildlife population monitoring;

Tools: camera trapping, distance sampling, population modelling, stable isotope analysis

Colin Studds

Associate Professor, GES

Select current projects:

Smithsonian Institution – Gut reactions: the impact of habitat quality on the gut microbiota of migratory birds overwintering in the Caribbean

National Geographic Society – Tracking songbird movement through urban forest patches in Baltimore

USDOD – Unravelling the migratory connectivity of Neotropical-Nearctic migratory birds

Future ICARE-based projects may deal with...

- Bird abundance and species diversity in urban forests
- Patterns of mammal biodiversity across an urban-rural gradient
- Geographic origins of birds migrating through Baltimore
- Mammal occupancy and movement using UAV technology

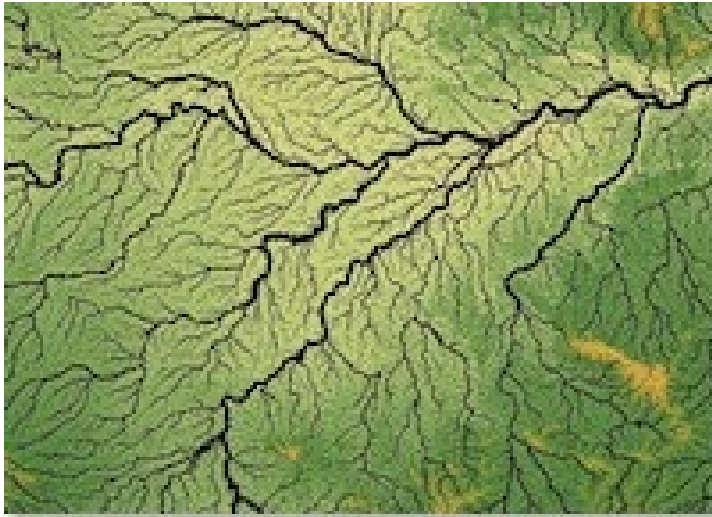
For more information: [lab website](#); [Google scholar](#)

Christopher Swan

Professor, Geography & Environmental Systems

Expertise: Ecology, Freshwater Ecosystems

Research focus:



Keywords: river networks, stormwater pond ecology, urban vacant land

Tools: environmental sensors, plant physiological equipment, spectrophotometry, fluorometry

Christopher Swan

Professor, Geography & Environmental Systems

Select current projects:

- National Science Foundation, “The role of dendritic network topology and environmental filtering in shaping the ecology of spatially structured communities”
- German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig – “sUrBioCity – Deciphering Drivers of Urban Biodiversity across Multiple Scales”
- National Science Foundation – LTER Network Communications Office – “A synthesis to identify how metacommunity dynamics mediate community responses to disturbance across the ecosystems represented in the LTER network.”
- National Science Foundation – “Urban Water Innovation Network (U-WIN): Transitioning Toward Sustainable Water Systems”

Future ICARE-based projects may deal with...

- Synthesis of taxonomic, functional and phylogenetic information on urban plant communities
- Carbon processing of leaf litter across a rural to urban gradient
- Plant water stress across urban land use types

For more information: <https://biodiversity.umbc.edu/>

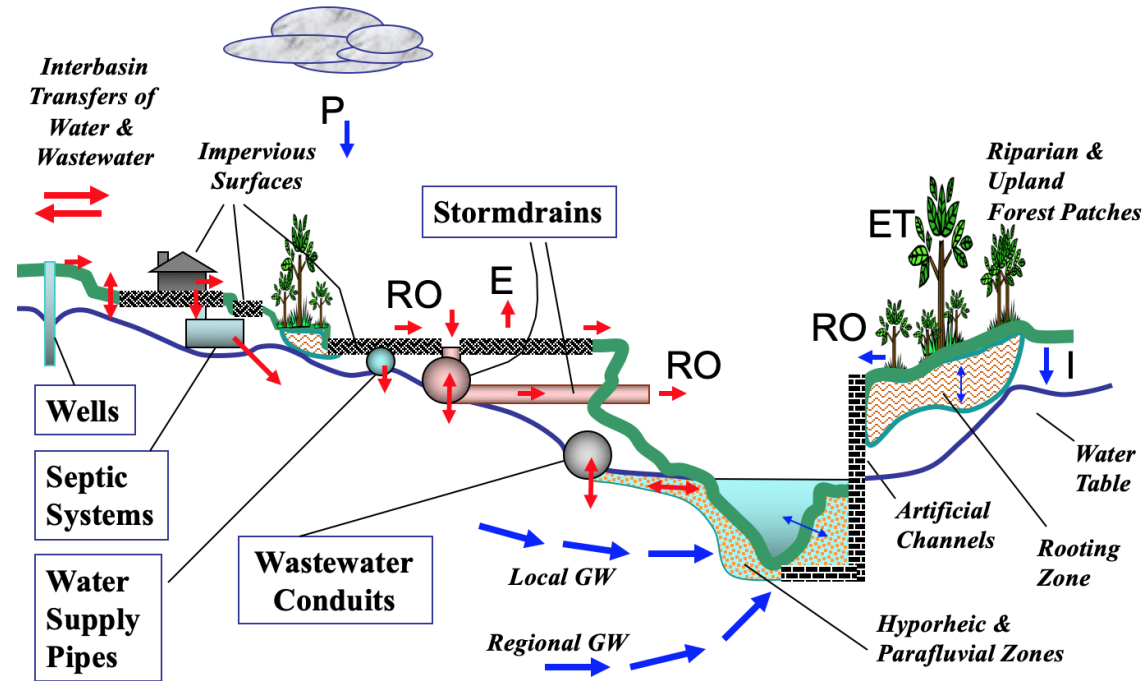
Claire Welty

Professor, CBEE; Director, CUERE

Expertise

Research focus

Urban hydrology; subsurface contaminant transport



Keywords

Urban groundwater-surface water interactions; urban water quality; urban water and biogeochemical cycles

Tools

Hydrologic modeling; field instrumentation (high-frequency water quality sensors, stream gages, rain gages, instrumented stormwater pipes and wells); ion chromatography for water anion analyses; wavelength-scanned cavity-ring-down spectroscopy for water isotope analysis

Claire Welty

Professor, CBEE; Director, CUERE

Selected current projects

- Urban Water Innovation Network (U-WIN): Transitioning toward sustainable urban water Systems
- Urban resilience to climate change-driven extreme events
- Quantifying the effects of stream restoration on nitrate loads in nested urban watersheds using a high-frequency sensor network
- Baltimore Ecosystem Study Long-Term Ecological Research project

Future ICARE-based projects may deal with...

- Contribution of groundwater to nitrate loads in urban streams
- Software infrastructure for transformative urban sustainability research
- Impacts of stormwater facilities on thermal loads in Maryland streams
- Evaluation of urban critical zone processes

For more information: <https://userpages.umbc.edu/~weltyc/>
https://www.researchgate.net/profile/Claire_Welty