

SMITHSONIAN-MASON SCHOOL OF CONSERVATION (SMSC)

500 Level Courses

SMSC 0501: *Generalized Linear and Mixed Models in Ecology and Conservation*. 6 credits.

This regression-based analytical course combines lectures on theory and concepts with significant time practicing statistical tools within the R environment. The course concludes with a final project module where participants work independently to conduct a full analysis of a provided dataset and present their results. This course covers: probability theory, random variables and statistical distributions, linear models, generalized linear models, model diagnostics, data transformations, visualizing results, missing data and collinearity. Offered through the Smithsonian-Mason School of Conservation in cooperation with the Smithsonian Conservation Biology Institute in Front Royal, VA. This course is taught as an intensive, mixed format (lectures and computer work) offering, in a residential full-day (8:30am-6pm), 2 week session. Course includes a required Saturday morning session with Sunday as a free day. An online asynchronous format (7.5 wk) is also offered. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

This course is graded on the CEU or Non-credit scale. (<https://catalog.gmu.edu/policies/academic/grading/>)

SMSC 0511: *Estimating Animal Abundance*. 9 credits.

Estimating Animal Abundance Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0516: *Essentials of Spatial Ecology: GIS Analyses in R, QGIS, and Google Earth Engine*. 3.75 credits.

Essentials of Spatial Ecology: GIS Analyses in R, QGIS, and Google Earth Engine Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0523: *Practical Zoo Nutrition Management*. 3.75 credits.

Many zoological institutions inside the US and abroad care for hundreds and in some cases thousands of different species, all with specific dietary needs that may even vary across seasons and reproductive conditions. Making nutritional decisions for a wide range of species from around the world, and overseeing the daily management of food purchase, storage, and preparation is a complex and demanding task which must often be performed with little targeted training. This course is designed to assist interested individuals in gaining knowledge and hands-on experience within one of the oldest zoo nutrition programs in the US. Material covers a wide variety of topics within the field of zoo and wildlife nutrition, as well as some of the nuances of managing a commissary. The course is based at the National Zoo's satellite facility in Front Royal, Virginia and includes a behind-the-scenes tour at the National Zoo in Washington DC. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0524: *Camera Trapping Data Analysis*. 7.2 credits.

Camera Trapping Data Analysis Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0528: *The Ecology and Conservation of Migratory Birds*. 8.8 credits.

Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

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Schedule Type: Seminar

Grading:

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SMSC 0529: *Communication and Facilitation Skills for Conservation Managers*. 3.75 credits.
Communication and Facilitation Skills for Conservation Managers Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0530: *Bioinformatics Analysis for Conservation Genomics*. 6.75 credits.

This course, based at the SMSC campus in Front Royal, VA, provides a survey of the concepts, methods, and software used in conservation genomics research. Through lectures, discussions, and hands-on computer tutorials, students learn the steps of a complete conservation genomics project, including project design, genome assembly and quality control, variant calling, and estimation of genome-wide diversity and historical demography. Students will use the Unix command line to access Smithsonian high-performance computing. Instructors include scientists with expertise in conservation biology, theory, and genomics software. Students learn how to design conservation genomics projects, how to choose which software packages best fit their data, how to use common software packages, and how to interpret the results. By the end of the course, students will be able to conduct sophisticated genomic analyses and critically evaluate current conservation genomics literature. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0531: *AniMove: Statistics for Animal Tracking Data*. 4 credits.

AniMove: Statistics for Animal Tracking Data Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0532: *Managing Ecological Data in R*. 8.2 credits.

Tools that researchers typically use to manage small datasets are difficult, and sometimes even impossible, to implement when data grow to a certain size or complexity. As big data increasingly becomes a component of ecological study, there is a growing need to understand how to maintain large and complex datasets, prepare data for analysis, and develop a reproducible workflow. In this asynchronous online course, we will explore the science of data using Program R to determine how to best manage ecological data. We will focus on the structure and linguistics of data in R, how to integrate R into a data science workflow, and explore how to think about ecological data in new ways. Through a series of interactive lectures, guided analyses, and activities, students will gain a flexible toolkit for managing and exploring ecological data. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0533: *Decision Science for Conservation and Spatial Action Mapping*. 3.75 credits.

Decision Science for Conservation and Spatial Action Mapping Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar

Grading:

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SMSC 0535: *Animal Space Use and Movement Analysis in R*. 6 credits.

This 8-week, online, asynchronous professional course will teach the summary and analysis of animal movement data in R, and the application these data to research questions involving home ranges, movement behavior, habitat selection, and connectivity. The goal of the course is to: 1) teach the core themes and concepts underpinning animal movement behavior and the determinants of animal space use ; 2) familiarize students with the range of tools in R available to import, summarize, visualize and analyze animal movement data in R, and 3) expose them to the challenges and potential biases inherent in movement data, and how to address them at the design and analytical stage. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Registration Restrictions:

Enrollment is limited to Continuing Education -- CEU level students.

Schedule Type: Seminar**Grading:**

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SMSC 0536: *Computer Vision Methods for Ecology*. 9 credits.

This 3-week, residential, professional course will teach participants the rudiments of computer vision and how to train and evaluate computer vision models on their own data to help answer specific ecological research questions. The workshop is built on four key objectives: (1) Teach applied computer vision (CV) as a tool for ecological research by providing instruction and tools specifically designed for ecologists, built around real ecological data. (2) Empower ecologists to build their own CV-based systems by building intuition, skills and confidence by having them work with their own data. (3) Grow the CV-for-Ecology community, a hub where expert ecologists and leading CV scientists can exchange ideas and best practices to address real-world challenges in conservation and sustainability. (4) Provide necessary computational resources to store data, collect annotations, train models, and host solutions during the school. Students will leave with a working tool, a grasp of the underlying Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Schedule Type: Seminar**Grading:**

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SMSC 0537: *Statistics and Study Design in Ecology and Conservation*. 4.5 credits.

An understanding of statistics and study design is essential to success in the fields of ecology and conservation. However, many of the analyses of greatest utility for ecological data are frequently unable to be addressed in introductory courses, while advanced courses often delve deeply into a limited set of techniques. This course bridges this gap: building on knowledge obtained in introductory courses, additional techniques appropriate to many forms of ecological data and more advanced approaches will be introduced. This course will address the fundamentals of study design, linking choices made when establishing a research project to the types of analyses appropriate to the chosen design. Emphasis will be placed on understanding the output of analyses, and separating statistical significance from biological or ecological significance. Additionally, skills in data manipulation, analyses, and graphics using the R statistical computing environment will be developed. Offered by Provost's Office (<https://catalog.gmu.edu/colleges-schools/interdisciplinary-programs-courses/>). May not be repeated for credit.

Schedule Type: Lecture**Grading:**

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