# 课程预告

# Advanced Soil and Water Sciences

主讲人：李允聪教授, 万勇善博士, 高斌教授, 刘国栋教授

时间：晚上7：00－9：30 (6月19 – 7月7日)

地点：3号楼402 (报告内容和时间安排请查看附件)

**Dr. Yuncong Li** is the Research Foundation Professor of Soil Science in the Department of Soil and Water Science at the Tropical Research and Education Center, IFAS, University of Florida. He received his B.S. (1982) in Soil Science and Agricultural Chemistry from the Shandong Agricultural University, China, his M.S. (1990) in Agronomy from the University of Georgia, and his Ph.D. (1993) in Environmental Science from the University of Maryland. He is also an Affiliated Professor at the University of Florida’s Center for Tropical Agriculture, Hydrologic Sciences Academic Cluster, School of Natural Resources& Environment, and Water Institute, and a Courtesy Professor at the Shandong Agricultural University. He has received many awards and distinctions including Fellow of both the American Society of Agronomy and the Soil Science Society of America, Wilson Popenoe Award (InterAmerican Society for Tropical Horticulture), Outstanding Paper Award (Florida State Horticultural Society), Jim App Extension Award (University of Florida), Junior Faculty Research Award (International Honor Society of Science and Engineering), Senior Faculty Award (Honor Society of Agriculture), Research Innovation Award (University of Florida), Wachovia Extension Professional Award (Extension Association of Florida), and Research Foundation Professor Award (University of Florida). His research and extension program focuses on water and soil quality monitoring, assessment and remediation, management practices to improve nutrient use efficiency, and nutrient cycling in soils/sediments. He has authored or co-authored over 250 research papers, 90 extension articles and 17 book chapters. He co-edited two books, *Handbook of Soil Sciences* and *Water Quality Concepts, Sampling, and Analyses* (Taylor & Francis). He serves as an associate editor for *Critical Reviews in Environmental Science and Technology* and Communications in Soil Science and Plant Analysis. Additionally, he has chaired or co-chaired 34 graduate students, served as a committee member for 40 other graduate students, and supervised 14 postdoctoral fellows and many international visiting scientists.

**Dr. Bin Gao** is a professor in the Department of Agricultural and Biological Engineering at the University of Florida (UF). Before he joined the UF faculty, Bin was a research associate at Cornell University and a postdoctoral research associate at Yale University. He earned his Ph.D. degree in Environmental Engineering at Cornell University. His B.S. and M.S. degrees were received from Nanjing University in China. Bin's research mainly lies in studying water quality and environmental sustainability. It spans a broad range of topics including environmental nanotechnology, biochar technology, and contaminant hydrology. He has published more than 200 peer-reviewed research papers in top-ranking journals and contributed 1 book and 8 book chapters. He is a recipient of several prestigious awards, including the UF Term Professorship, UF Research Foundation Professorship, Gamma Sigma Delta Junior Faculty Award of Merit, Giglia Endowment Award, FASABE Outstanding Young Researcher Award, and NSF CAREER Award.

**Dr. Guodong Liu** is an Assistant Professor of Crop Nutrition in Horticultural Sciences Department, University of Florida/IFAS. He received his B.S. in Crop Science and his M.S. in Plant Physiology and Biochemistry from Hunan Agricultural University, China and his Ph.D. in Genetics and Physiology of Plant Nutrition at the Chinese Academy of Agricultural Sciences. He served as a Postdoctoral Research Associate in Genetics and Breeding of Plant Nutrition in the Institute of Genetics at the Chinese Academy of Sciences, Associate Professor and Professor in Plant Nutrition at the Chinese Academy of Agricultural Sciences. He has received a number of honors and awards including *Science Leader* for “the 21st Century for the Chinese Academy of Agricultural Sciences”; *Secretary, Vice Chair, and Chair*, the American Society of Horticultural Science Vegetable Crops Management Working Group; *Vice President*, the Florida State Horticultural Society; *Best Paper Award* of The Chinese Association of Sustainable Development, Jinan, Shandong, China; *Art Hornsby Distinguished Extension Professional and Enhancement Award*, University of Florida/IFAS; *Sadler Distinguished Extension Professional and Enhancement Award*, University of Florida/IFAS. His research and extension programs focus on enhancing water- and nutrient-use efficiency for fruit and vegetable production. He has authored or co-authored more than 80 research papers, 60 extension articles and 13 book chapters. He co-edited one book, *Novel Techniques of Efficient Utilization of Agricultural Resources and Their Applications* (Academic Press, Beijing, China). Additionally, he has chaired or co-chaired 7 graduate students, served as a committee member for 7 other graduate students, and supervised 4 postdoctoral fellows and 6 international visiting scientists.

**Course Title:** Advanced Soil and Water Sciences

1. **Instructors:** Drs. Yuncong Li, Bin Gao, Guodong (David) Liu
2. **Class schedule**: June 19-July 7, 2018, 10 lectures, 3 hours per lecture
3. **Class location:** Room 302 Building 3
4. **Textbooks:** Handouts
5. **Recommended readings:**

* Li, Y.C. and K. Migliaccio (ed.) 2010. Water Quality Concepts, Sampling, and Analyses. Taylor & Francis, Boca Raton, FL. (Available in the SDAU’s library) <http://lib.myilibrary.com/Open.aspx?id=290252&loc=&srch=undefined&src=0> (Available online)
* Tchobanoglous, G., Schroeder, E.D. 1985. Water Quality: characteristics, modeling, modification. Addison-Wesley Publishing Company.
* Huang, P.M., Y.C. Li, M.E. Sumner (ed.) 2011. Handbook of Soil Sciences, 2nd ed. Taylor & Francis, Boca Raton, FL. (Available in the SDAU’s library) <http://www.taylorandfrancis.com/books/details/9781439803035/> (Available in SDAU’s library)

1. **Course objectives:**

This course on Advanced Soil and Water Science will provide comprehensive instruction of the underlying concepts and principles of selected topics on water quality and soil science. Students will learn about fundamental water quality processes, nonpoint source pollution control, applications of water quality models, storm water management, and novel technologies and new research topics in soil and water science.

1. **Course outline:**

**Part I: Advanced water science**

Lecture 1: Fundamentals of water quality

* 1. Physical properties
  2. Chemical properties
  3. Nutrients and Biological
  4. The philosophy of water quality standards
  5. Bases for establishing water quality standard

Lecture 2: Water quality data analyses

1. Sensors for water quality data acquisition
2. Time series analysis
3. Multivariate techniques

Lecture 3: Water quality modeling

1. The mass balance approach
2. CFSTR model
3. PFR model
4. Transport processes
5. Water-air interface transfers
6. Water-soil interface transfers

Lecture 4: Water quality management

1. Best Management Practices (BMPs)
2. Treatment wetlands
3. Water quality management for Everglades Restoration

**Part II Advanced Soil Science**

Lecture 5: Advance of soil science

Lecture 6: oxidation and reduction

Lecture 7: Soil organic carbon, nitrogen, and phosphorus

**Part III: New technology for improving soil and water quality (Dr. Gao)**

Lecture 8: Nanotechnology (I)

* 1. Nanotechnology Basics
  2. Nanotechnology benefit
  3. Nanotechnology for soil and water quality: Overview
  4. Potential risks of nanotechnology

Lecture 9: Nanotechnology (II)

* 1. Applications of Nanotechnology
  2. Water quality monitoring: Nanosensors
  3. Soil and groundwater remediation

Lecture 10: Biochar technology

1. Biochar basic
2. Biochar production
3. Biochar properties
4. Biochar as a soil amendment
5. Biochar as an adsorbent

**Tentative schedule (7-9:30pm; Building #3 Room 302)**

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| **Lecture** | **Contents** | **Date** |
| 8 | Nanotechnology I (B. Gao) | 06/19 |
| 9 | Nanotechnology II (B. Gao) | 06/20 |
| 1 | Water quality fundamentals (YW) | 06/21 |
| 2 | Water quality data analysis (YW) | 06/22 |
| 6 | Soil oxidation and reduction (David Liu) | 06/23 |
| 7 | Soil organic carbon, nitrogen and phosphorus (David Liu) | 06/24 |
| 10 | Biochar for water quality (David Liu/Y. Li) | 06/25 |
| 5 | Advance of soil science (Y. Li) | 06/26 |
| 3 | Water quality modeling (YW) | 07/06 |
| 4 | Water quality management (YW) | 07/07 |

**Methods of Evaluation:**

The final grade in the course will be determined based on the following components:

Class participation - 40 percent

Assignments/home work/exam – 60 percent