



**NORTH CAROLINA AGRICULTURAL  
AND TECHNICAL STATE UNIVERSITY**



**TWENTY FIVE YEARS  
OF  
THE INTERDISCIPLINARY  
WASTE MANAGEMENT  
INSTITUTE (WMI)**

A university-level institute of the University of North Carolina System

**1995-2020**

Godfrey A. Uzochukwu, Ph.D., LSS, PCCSL  
Senior Professor and Founding Director



*“Through out my career, in supply chain, many have been thoroughly impressed with my Waste Management Certificate ... In my current career with Volvo, with the training you gave me, I’ve been able to save the company millions of dollars by reusing or recycling materials ...”*

*-Valosha Ashley Odom, WMI Certificate 2009*



# CONTENTS

Preface.....4

Administrators ..... 5

WMI Noteworthy Summary.....6

WMI Program Components..... 7

The Beginning of WMI ..... 8

Organization and Administration.....9

Institute Director .....10

Administrative Infrastructure.....10

Interdisciplinary WMI Staff..... 11

Overview of the Interdisciplinary WMI..... 11

Mission..... 11

Goals and Objectives ..... 12

Interdisciplinary Model – Futures Goal II..... 16

A. WMI Instruction..... 17

WMI Courses: 2006-2019 ..... 18

WMI Student Enrollment: 2006-2019..... 19

Degree Programs with WMI Certificates ..... 20

Certificate Tracks.....20

Policies and Procedures.....24

Application for a Waste Management Certificate ..... 25

Waste Management Certificates Awarded..... 26

Application for the Advanced Waste Management Certificate ..27

Advanced Certificates Awarded (2001-2019) ..... 28

Career Paths for Certificate Recipients.....30

Internships/Employment – Student Success ..... 31

Interdisciplinary Graduate Certificate Program ..... 32

B. WMI Research..... 33

WMI Research Areas .....34

Collaborative Interdisciplinary Projects..... 35

WMI Funding History Grants & Contracts..... 36

Collaboratives ..... 37

C. WMI Service/Outreach.....38

UI GreenMetric University Sustainability Ranking ..... 40

Community Engagement.....42

Sustainability Leadership at N.C. A&T.....44

UNC Tomorrow ..... 45

UNC Recycling Committee ..... 46

NCSE Member Institutions..... 47

Partnership..... 48

Science Club Project.....48

Former WMI Student Employees .....49

Interdisciplinary WMI Program Impact..... 50

## PREFACE

Founded on the belief that waste management is “the key to innovation, creativity and productivity,” the Interdisciplinary Waste Management Institute (WMI) is responsible for coordination of environmental and waste management instruction, research, outreach, internship, faculty development, and student development within various departments at North Carolina Agricultural and Technical State University (N.C. A&T). WMI also offers undergraduate and graduate certificate programs in waste management, advises students who are interested in environmental and waste management careers, and serves as the university’s clearinghouse for environmental and waste management activities. The WMI certificate programs add value to degree programs. For 25 years, WMI has helped to raise awareness of waste management issues and sustainability.



**Godfrey A. Uzochukwu**  
**Ph.D., LSS, PCCSL**  
Senior Professor and  
Founding Director.

### **In September 1994, the Department of Energy awarded \$1.4 million to N.C. A&T to establish a Waste Management Institute.**

Investment in the nation’s climate, energy, water, waste management, transportation, education and infrastructure challenges out-weighs the cost of doing nothing. With this in mind, WMI began to raise awareness about environmental concerns for N.C. A&T students, faculty, staff and individuals from all walks of life. In so doing, WMI embarked on a national conversation about environmental protection through a series of national symposia and conferences.

By working together across divides, WMI faculty and student affiliates are demanding new level of leadership to tackle environmental crises and sustainability before it is too late. Environmental crises such as climate driven seas level rise, ocean acidification, waste

management, heat waves, wildfires, disease spread, and massive damage of biodiversity and more affect food, water, air, land, energy securities and inflicting serious economic losses globally. WMI is calling for quicker environmental sustainability action to contribute knowledge and passion for effective solutions.

Over the past 25 years, WMI has led the creation of interdisciplinary Energy and Environment Ph.D. program (renamed Science and Technology) and informed interdisciplinary Leadership Studies Ph.D. program, inspired interdisciplinary Computational Science and Engineering Ph.D. program and several interdisciplinary masters, bachelors, and certificate programs and research centers at N.C. A&T. The Institute has established several strategic partnerships with local governments and companies and institutes and universities around the world.

WMI’s interdisciplinary team of faculty and students are looking ahead to next 25 years and hoping to keep breaking new ground in environmental sustainability and waste management including diving into design thinking framework to deliver better, more human-centered environmental outcomes to the market.

Michael Reagan, N.C. DEQ Secretary and 1998 WMI graduate said “...the professors all seemed personally invested in helping students thrive...I spent a lot of time with Dr. Uzo setting up the Waste Management Institute...He really pushed me...” More than 2,200 students have been awarded the WMI certificates from 1995-2019. Other notable WMI graduates include Ashley Odom (Volvo), Broadus Funderburk (Guilford County, N.C.), Allen Roberts (Georgia State University), Angela Davis (ITG), Miranda Jackson (FedEx) and more.

In February 1994, Chancellor Emeritus Edward B. Fort and Uzochukwu travelled to the Department of Energy Savannah River Site, in Aiken, South Carolina where Fort addressed African American employees and urged them to support the legacy of Dr. Martin Luther King Jr. and provide funds to establish a Waste Management Institute at N.C. A&T. In June 1994, the General Administration of the University of North Carolina System approved the establishment of an Interdisciplinary Waste Management Institute at NC A&T and Uzochukwu was named the founding director. In September 1994, the Department of Energy awarded \$1.4 million to N.C. A&T to establish a Waste Management Institute. In May 1995, Former Vice Chancellor Harold L. Martin Sr. (now Chancellor) implemented the WMI Certificate program and the first Waste Management Certificate was awarded to 16 students from different disciplines and 25 years later, more than 2,200 waste management certificates have been awarded to N.C. A&T graduates. Thanks to Dr. King for supporting sanitation workers in Memphis, Tennessee in 1968.



### **Current Administrators**

Dr. Harold L. Martin Sr.	Chancellor
Dr. Beryl C. McEwen	Provost and Executive Vice Chancellor for Academic Affairs

### **Academic Deans**

Dr. Mohamed Ahmedna	College of Agriculture and Environmental Sciences
Dr. Frances Ward-Johnson	College of Arts, Humanities, and Social Sciences
Dr. Kevin James	College of Business and Economics
Dr. Miriam Wagner (Interim)	College of Education
Dr. Robin N. Coger	College of Engineering
Dr. Lenora Campbell	College of Health and Human Sciences
Dr. Abdellah Ahmidouch	College of Science and Technology
Dr. Clay Gloster	Interim Dean, The Graduate College

### **Acknowledgements of Former Administrators, Faculty Affiliates and WMI Staff**

Dr. Edward B. Fort	Chancellor Emeritus
Dr. James Renick	Chancellor
Dr. Lloyd Hackley	Interim Chancellor
Dr. Stanley Battle	Chancellor
Dr. Edward J. Hayes	Vice Chancellor for Academic Affairs
Dr. Earnestine Psalmonds	Vice Chancellor for Research
Dr. Carolyn Meyers	Provost and Vice Chancellor for Academic Affairs
Dr. Linda Adams	Provost and Vice Chancellor for Academic Affairs
Dr. Joe B. Whitehead	Provost and Vice Chancellor for Academic Affairs
Dr. Kenneth Murray	Associate Vice Chancellor for Academic Affairs
Dr. B. C. Webb	Dean, College of Agriculture and Environmental Sciences
Dr. Alton Thompson	Dean, College of Agriculture and Environmental Sciences
Dr. Samuel J. Dunn	Chairman, Department of Plant Science & Technology

### **WMI Faculty Affiliates**

Dr. Linda Callahan, Journalism and Mass Comm  
 Dr. Vereda Williams, Economics  
 Dr. G. B. Reddy, Natural Resources  
 Dr. M. R. Reddy, Natural Resources  
 Dr. Emmanuel Nzewi, Civil Engineering  
 Dr. Michael Simmons, Economics  
 Dr. Godfrey Gayle, Biological Engineering  
 Dr. Dilip Shah, Environmental Health and Safety  
 Dr. Samuel Moseley, Political Science  
 Dr. Ralph Noble, Animal Sciences  
 Ron Bailey, Architectural Engineering

### **WMI Students**

Michael Reagan  
 Sheena Shearin  
 Brandon Williams  
 Channing Milligan  
 Stephen Johnson  
 Tarcy Keys  
 Juanita Scott  
 Tarrell Taylor  
 Broadus Funderburk  
 Travis Funderburk  
 Miranda Jackson  
 Emmanuel Oleka  
 Aaron Carr

### **WMI Staff**

Doris Maxwell, USEPA Campus  
 Executive  
 Carolyn Ruff  
 Netta Sanders  
 Gwendolyn Haith  
 Felicia Webster  
 Je'Milla Willioughby  
 Karen Bragg  
 Patricia Gilliam  
 Cheryl Bowers  
 Angela Smith

## WMI NOTEWORTHY SUMMARY

- **Selected Interdisciplinary Model for N.C. A&T – Futures Goal II** (*Created Interdisciplinary Energy and Environmental Systems Ph.D. (Renamed Science and Technology Ph.D.); Informed Interdisciplinary Leadership Studies Ph.D.; Inspired the creation of Interdisciplinary Computational Science and Engineering Ph.D.; Interdisciplinary masters, bachelors and certificate programs*).
- Lead Institute for the Interdisciplinary Graduate Certificate Tracks in Environmental Engineering, Environmental Sciences, Environmental Justice and Environmental Health and Safety
- Awarded \$1.4 million to establish interdisciplinary WMI
- Awarded \$18 million NSF Inter-institutional (A&T, NCSU, UNC -CH and UT Austin) for saving water
- Campus-wide resource for faculty and students (*awarded \$384,000 to students in different colleges, provided \$33,191 for faculty support, created core WMI courses with enrollment of 1,798 students – 2006-2019*)
- WMI works with 18 academic departments to tailor WMI core and over 360 courses offered by departments to follow an interdisciplinary waste management curriculum
- Awarded 2,246 WMI Certificates (*1,943 undergraduate and 273 Advanced for adding value to degree programs and created 22 career paths for students who received certificates*)
- Facilitated top 2% in 2017 (No. 14 overall) and No. 4 in USA rankings (*UI Green Metric – University Sustainability World Ranking for N.C. A&T and ranked in the top 7% for five consecutive years 2013, 2014, 2015, 2016 and 2017*)
- Selected No. 1 by the Environmental Careers Organization for innovative programming and diversity
- Recognized by the Greensboro Chamber of Commerce as an innovative environmental program
- Top 28 interdisciplinary institute/center in USA (2013 NCSE report - 360 were profiled)
- Created Convergence Research Thrusts for environmental and waste management solutions involving air, soil, water, bio-energy, global climate, education and infrastructure
- Conducted STEM environmental security and waste management workshops for 876 high school students
- Hosted four national environmental conferences, one national environmental expo and one national environmental symposium
- UNC Tomorrow “*Environment*” Work Group Leader
- University Recycling Committee Leader – Co-launched University Recycling program in 2011
- Member of National University Network-NCSE (110 universities)
- Member of International University Network (619 UI GreenMetric)
- Forum for exchange of big ideas among students from different disciplines
- Forum for exchange of big ideas among faculty members from different disciplines
- Brings environmental industry leaders to campus
- Promotes economic growth for the City of Greensboro through national conferences



# INTERDISCIPLINARY WASTE MANAGEMENT INSTITUTE PROGRAM COMPONENTS



## University of North Carolina System General Administration (UNC-GA) Mandate

*“... This office has reviewed your request to establish a Waste Management Institute. We conclude that the proposed unit, as described, will be an academic support unit with more limited research and public service functions... Establishment of a Waste Management Institute is hereby approved ...”*

*- C. D. Spangler Jr., President*

## Chancellor's Mandate

*“... Coordination of waste management and environmental efforts (instruction, research and outreach of the university which now exist in individual departments; implementation of certificate programs in waste management... advisement of students who are interested in environmental and waste management careers; and clearing house for the university's environmental/waste management activities ...”*

*- Edward B. Fort, Chancellor*

# The Beginning of WMI



WEDNESDAY'S NEWS TO USE ►



## A&T gets \$1.4 million to study waste handling

● N.C. A&T State University wins a grant to promote waste-handling research.

BY TAFT WIREBACK  
Staff Writer

N.C. A&T State University accepted the first part of a \$1.4 million grant Tuesday to improve America's waste-handling abilities and to expand the role of minority scientists in that effort.

Thomas Heenan of the U.S. Department of Energy gave the school \$262,000 as part of a three-year grant to the univer-

sity's new Waste Management Institute. The grant also is aimed at bolstering ties to historically black colleges and universities and at interesting more minority students in waste-management careers, he said.

"It's always hard to predict the future, but we look forward to a long-term partnership that will provide us with trained people," said Heenan, assistant manager of environmental restoration and solid waste at the department's Savannah River operations office in Aiken, S.C.

The new institute seeks to improve disposal techniques and to train students in the management of all types of materi-

als, from household garbage and hazardous chemicals to nuclear waste.

Chancellor Edward Fort said the university will use teachers and researchers from various disciplines at the institute, started earlier this year. Fort said the institute is working on waste-management issues that touch a variety of schools within the university, ranging from chemical engineering to soil conservation and business.

Fort said that much of the waste-management effort will take place in a planned, \$23 million center for interdisciplinary research — projects involving researchers from more than one area of learning.

Waste-management studies and research already are under way at the university, said Godfrey Uzochukwu, the institute's director and a professor of environmental science. "This grant will help us to enhance the capabilities of our labs," Uzochukwu said.

## WMI Motivation

- 1990's – Environmental Justice Issues
- Warren County PCB landfill
- Camp Lejeune Chemical leak
- White Street Landfill, Greensboro
- President Clinton's Executive Order 12898, March 16, 1994
- Environmental Justice in Minority and Low Income Populations

*The WMI was approved on June 8, 1994 by UNC GA*





# ORGANIZATION AND ADMINISTRATION

## Steering Committee

Michael Atkinson, Ph.D.	Department of Mechanical Engineering
Renzun Zhao, Ph.D.	Department of Civil and Architectural Engineering
Omar Basha, Ph.D.	Department of Chemical Engineering
Godfrey Ejimakor, Ph.D.	Department of Agribusiness
Alesia Ferguson, Ph.D.	Department of Built Environment
Gregory Goins, Ph.D.	Department of Natural Resources
George Robinson, Ph.D.	(Psychologist), Department of Psychology
Godfrey Uzochukwu, Ph.D.	Interdisciplinary Waste Management Institute

## Interdisciplinary WMI Faculty Affiliate

Niroj Aryal, Ph.D.	College of Agriculture and Environmental Sciences
Michael Atkinson	College of Engineering
Fafanyo Asiseh, Ph.D.	College of Business and Economics
Omar Basha, Ph.D.	College of Engineering
Kory Bennett, Ph.D.	College of Engineering
Heather Colleran, Ph.D.	College of Agriculture and Environmental Sciences
Derome Dunn, Ph.D.	College of Engineering
Godfrey Ejimakor, Ph.D.	College of Agriculture and Environmental Sciences
Gregory Goins, Ph.D.	College of Agriculture and Environmental Sciences
Louis Jackai, Ph.D.	College of Agriculture and Environmental Sciences
George Robinson, Ph.D.	College of Health and Human Sciences
Amy Schwartzott, Ph.D.	College of Arts and Humanities
Mary Smith, Ph.D.	College of Science and Technology
Stephanie Luster-Teasley, Ph.D.	College of Engineering
Godfrey Uzochukwu, Ph.D.	Interdisciplinary Waste Management Institute
Tobin N Walton, Ph.D.	College of Health and Human Sciences
Renzun Zhao, Ph.D.	College of Engineering
Gregory Meyerson, Ph.D.	College of Arts, Humanities and Social Sciences

## WMI External Advisory Board (Big Ideas and New Perspectives)

- **Ramboll/O'Brien & Gere Ltd.** - Mike Hall
- **Waste Industries USA** - David Pepper
- **Environmental Protection Agency** - Hillary Ward
- **City of Greensboro** - Dale Wyrick
- **Hackley and Associates** - Lloyd Hackley
- **IBM** - Xavier Montgomery



## INSTITUTE DIRECTOR

Godfrey A. Uzochukwu, Ph.D.

The director has full responsibility for administration and day to day operation of the WMI. The director is a tenured professor in the department of Natural Resources. The following academic units are participating in the activities of the Waste Management Institute:

- Animal Science
- Agricultural Education
- Agricultural Economics
- Architectural Engineering
- Biology
- Biological Engineering
- Biomedical Engineering
- Business Administration
- Curriculum and Instruction
- Chemical Engineering
- Chemistry
- Civil Engineering
- Electrical Engineering
- Economics
- Journalism and Mass Communication
- History
- Family and Consumer Science
- Industrial Systems Engineering
- Construction Management and Safety
- Mathematics
- Mechanical Engineering
- Natural Resources
- Nursing
- Political Science
- Physics, Psychology and
- Social Work

## ADMINISTRATIVE INFRASTRUCTURE



*The Institute conducts its activities through faculty members and facilities of the participating departments.*



## INTERDISCIPLINARY WMI STAFF

### **Fabiana Constable**

Graduate Administrative Assistant (GAA)

### **Quincey Lee**

Undergraduate Research Assistant

### **Nallah Muhammad**

Senior Undergraduate Research Assistant

Faculty, Staff and Student Volunteers

## Overview of the Interdisciplinary Waste Management Institute (WMI) ▼

- WMI is an interdisciplinary academic support unit with limited research and public service functions under the leadership of the College of Agriculture and Environmental Sciences.
- A full-time faculty director leads WMI's small staff of three, as well as contributing interdisciplinary faculty members.
- WMI's activities prioritize education and student success, and additional goals are outreach, research and campus sustainability.
- In addition to certificate programs for undergraduates and graduate students, WMI works with academic departments to tailor WMI capstone courses and other courses to follow an interdisciplinary waste management certificate curriculum. These courses cover topics such as recycling, environmental ethics and philosophy, environmental justice and hazmat training.
- WMI conducts community outreach in environmental and waste management activities include a pre-college workshop and a summer science intensive for selected K-12 students from North Carolina public schools.
- WMI also provides consulting services and partnership opportunities to improve technology transfer, information management, and health and safety training within industry, small businesses and government agencies.

## MISSION

To enhance awareness and understanding of waste management issues and develop programs that protect the environment and improve the quality of life. The program aligns with N.C. A&T mission as it prepares students to enhance the quality of life for themselves, the citizens of North Carolina, the nation, and the world. The **interdisciplinary** program achieves this through exemplary instruction and interdisciplinary studies, scholarly and creative research, courage and community service.

# Goals and Objectives

**Goal 1.** Increase the number of minority professionals who will work in environment and waste management fields.

## Objectives

Offer courses in waste management that encompass technical, scientific, legal/policy, economics/business, psychological, sociological, and ethical issues including historical perspectives

Prepare graduates who will have an in-depth knowledge of environmental and waste management



WMI Class Setting

## Goal 2.

Develop cooperative and exchange programs involving faculty, students, government and industry.

### Objective

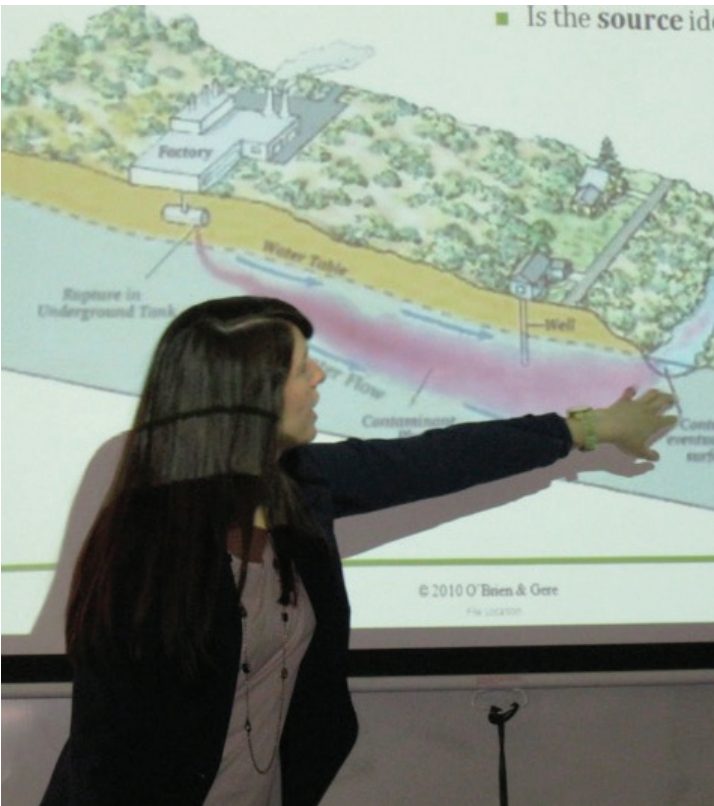
Establish partnership with industry and government



L-R Dr. Scott Jenkins, Mayor Nancy Vaughan, Dr. Godfrey Uzochukwu and Dean Robin Coger



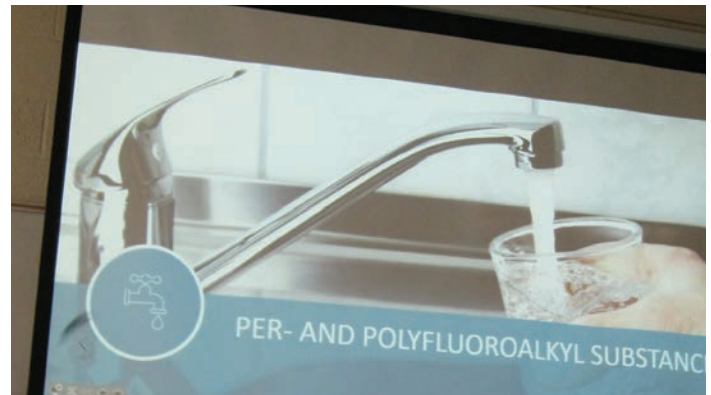
O'Brien & Gere presenters with WMI scholar



O'Brien & Gere presenter



U.S. Environmental Protection Agency's Dr. Tina Ndoh



Gas contaminated tap water

**Goal 3.**

**Serve as institutional sponsor of public awareness workshops and lecture series**

**Objectives**

Organize and conduct waste management seminars, workshops and lecture series for middle and high school students, teachers, private industry, and the general public 2013 National Conference on Environmental Science and Technology

**Conference Presentations**



Student poster presentation



Dr. Uzo with Waste Industries' conference attendees

**US Environmental Protection Agency Keynote Speaker**



Dr. Uzo addressing conference attendees



U.S. EPA Keynote Speaker

**Goal 4. Support interdisciplinary research programs.**

**Objectives**

Involve faculty in nationally significant waste management research activities  
Provide financial support for faculty research initiatives

**Waste Management Research**



Students learning how to manage waste – Waste Industries tour

## Interdisciplinary Model – Futures Goal II:

WMI was selected as the interdisciplinary model for N.C. A&T. WMI created Interdisciplinary Energy and Environmental Systems Ph.D. and inspired Interdisciplinary Leadership Studies Ph.D., Interdisciplinary Computational Science and Engineering Ph.D. and Interdisciplinary Bachelors and Certificate programs. WMI was a member of Chancellor's FUTURES Planning and Resource Council for interdisciplinary perspectives and big ideas.

### Goal II: Interdisciplinary Programs and Centers



Uwechueke

The second goal of the interdisciplinary university initiative is to deliver visionary and distinctive interdisciplinary academic studies, research, and service and include global collaborations and partnerships as part of the learning experience.

The interdisciplinary programs and centers are expected to enhance the learning environment and image of A&T and the preparation and marketability of its graduates by providing increased participation in study abroad programs, international internships, and opportunities for international service learning.

The goal team is considering strategies to: add interdisciplinary and international educational opportunities; establish and enhance international partnerships; enhance studies, faculty, and staff participation in global interdisciplinary experiences; provide intellectual, physical, and technological infrastructure and financial resources that will effectively support the interdisciplinary programs; and to re-brand the university's global image.

The team is also working on activities named at the campus-wide context. These activities include suggested timelines and specific, measurable targets:

#### Activities

By August 2015, establish and/or enhance interdisciplinary academic centers and programs that will attract and enroll at least 10% (or 1,000 students) of the student body by August 2017.

By August 2015, each academic center will establish and implement at least two partnerships with industrial, governmental, educational, or community entities.

By August 2015, create international study, internships, and service learning programs for faculty and at least 10% (or 1,000 students) of the student body.

Establish curriculum review and revision processes from general education through doctoral programs that encourage the inclusion of interdisciplinary and internationally focused curricula across the University's Colleges and Schools.

Dr. Gabriel Uwechueke, professor and director of the Waste Management Institute at N.C. A&T, is chair of the implementation team for this goal. Other team members include Dr. Claude Basso, professor and chair of the department of political science; Lt. Col. Larry Brown, invasion commander, Army ROTC; Missa Ruth Myers, interim director.

### Goal III: Responsive Learning Environment



Bowington

The third goal is to create a responsive learning environment that utilizes an effectively integrated administrative support system to foster high quality programs, research, and collegial interactions, and effectively disseminate critical information to University stakeholders.

The team will create the establishment of a responsive learning environment that will realize the university's commitment to its interdisciplinary transformation and will establish a model for excellence through efficient programs for operational integration, personal development, marketing, and trends and recognition.

Strategies include providing opportunities for faculty and staff development to enhance the university's transition to an interdisciplinary environment; identifying physical and cultural barriers that may limit the successful transition to an interdisciplinary model, and develop programs to evaluate or minimize these barriers; coordinating program integration and development among Business, research, technology and education; stimulating interdisciplinary scholarly research to increase both the volume of research and the number of faculty members participating in interdisciplinary research; enhancing the university's reputation for excellence among internal and external stakeholders and promoting community partnerships with industrial, governmental, and educational organizations to facilitate program excellence.

The team is also working on activities named at the campus-wide context. These activities include suggested timelines and specific, measurable targets:

#### Activities

By August 2012, establish an Interdisciplinary Center for Academic Excellence to serve as a gateway for the delivery of information to University stakeholders and for the administration of the interdisciplinary model.

By August 2012, develop programming for faculty and staff that addresses cultural transformation and facilitates leadership development, communication and collaborative skills development, and professionalism through the Academy of Teaching and Learning.

Create recognition and award programs for participants and contributors to the effective transformation and delivery of interdisciplinary programs and activities.

Create a resource center that supports scholarly research and grantmanship.

Create program incentives that reward interdisciplinary research and grantmanship.

Individuals selected to serve on the implementation team for this goal include Dr. Janice Bowington, interim associate vice chancellor for academic affairs/learning, innovation.





# A. WMI Instruction

WMI works with academic departments to tailor WMI core courses and over 360 courses offered by departments to follow an interdisciplinary waste management certificate curriculum and also embed environmental and waste management in departmental academic curricular. Scholarship were awarded to qualified students. Students were recommended for environmental/waste management internships.

## IBM/NCAT Design Thinking Initiative

The goal of the IBM/NCAT Design Thinking Initiative is to expose students to new ways of solving complex problems and offering students a structured framework for understanding and pursuing innovation in ways that contribute to their growth and add value to their campus and their careers.

## WMI Impact on Colleges: Scholarships Awarded To Students (\$384,000)

Agriculture and Environmental Sciences	\$121,350
Arts, Humanities and Social Sciences	37,150
Business & Economics	10,550
Education	3,700
Engineering	163,600
Nursing	29,500
Science & Technology	18,800
<b>Faculty Support</b>	<b>\$33,191</b>

## WMI Core Courses (1,798 students have taken these courses) 2006-2019

- WMI 236 – Recycling
- WMI 333 – Capstone
- WMI 417 – Environmental Ethics
- WMI 419 – 05A-Environmental Justice
- WMI 429 – 40-Hour Hazmat
- WMI 490 – Independent Study in Waste Management
- WMI 617\* – Environmental Ethics
- WMI 619 05A\* – Environmental Justice
- WMI 629\* – 40-Hour-Hazmat Training
- WMI 747\*\* – Advanced Capstone

\*Graduate students and undergraduates who have 3.25 GPA

\*\*Graduate students only

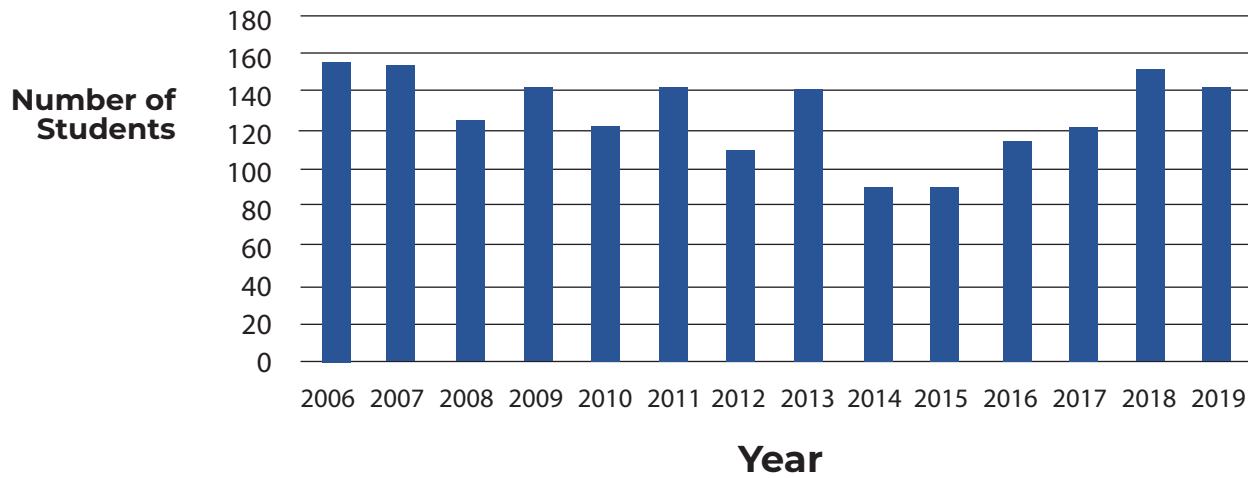
## Enrollment in WMI Courses: 2006-2019 (1,883 Students)

1995 – 2006: WMI Courses were selected from departments

COURSE	SEMESTER	NO. OF STUDENTS	COURSE	SEMESTER	NO. OF STUDENTS
WMI 747	Fall 2006	10	WMI 617	Fall 2015	19
WMI 333	Fall 2006	52	WMI 333	Fall 2015	25
WMI 747	Spring 2006	15	WMI 619	Spring 2015	11
WMI 333	Spring 2006	53	WMI 747	Spring 2015	11
WMI 333	Spring 2006	25	WMI 333	Spring 2015	25
WMI 617	Fall 2007	14	WMI 236	Fall 2016	35
WMI 747	Fall 2007	16	WMI 333	Fall 2016	31
WMI 333	Fall 2007	50	WMI 333	Spring 2016	38
WMI 747	Spring 2007	13	WMI 747	Spring 2016	10
WMI 333	Spring 2007	60	WMI 417	Fall 2017	12
WMI 617	Fall 2008	17	WMI 236	Fall 2017	24
WMI 333	Fall 2008	44	WMI 333	Fall 2017	22
WMI 747	Spring 2008	10	WMI 629	Spring 2017	7
WMI 333	Spring 2008	54	WMI 333	Spring 2017	43
WMI 617	Fall 2009	31	WMI 747	Spring 2017	11
WMI 333	Fall 2009	40	ENVS 210	Fall 2018	25
WMI 747	Spring 2009	20	WMI 417	Fall 2018	9
WMI 333	Spring 2009	51	WMI 617	Fall 2018	4
WMI 617	Fall 2010	22	WMI 236	Fall 2018	26
WMI 333	Fall 2010	35	WMI 333	Fall 2018	33
WMI 747	Spring 2010	26	WMI 629	Spring 2018	4
WMI 333	Spring 2010	39	WMI 333	Spring 2018	37
WMI 617	Fall 2011	21	WMI 747	Spring 2018	13
WMI 333	Fall 2011	45	WMI 419	Spring 2019	10
WMI 747	Spring 2011	26	WMI 629	Spring 2019	10
WMI 747	Spring 2011	20	WMI 333	Spring 2019	36
WMI 333	Spring 2011	31	WMI 747	Spring 2019	8
WMI 617	Fall 2012	22	WMI 419	Spring 2019	12
WMI 333	Fall 2012	34	WMI 619	Spring 2019	2
WMI 747	Spring 2012	22	WMI 333	Fall 2019	42
WMI 333	Spring 2012	31	WMI 236	Fall 2019	23
WMI 617	Fall 2013	14	WMI 333	Spring 2020	37
WMI 236	Fall 2013	23	WMI 419 & 619	Spring 2020	23
WMI 333	Fall 2013	24	WMI 429 & 629	Spring 2020	13
WMI 747	Spring 2013	18	WMI 490	Spring 2020	3
WMI 236	Spring 2013	31	WMI 747	Spring 2020	9
WMI 333	Spring 2013	31			
WMI 617	Fall 2014	13			
WMI 333	Fall 2014	22			
WMI 747	Spring 2014	17			
WMI 333	Spring 2014	38			
<b>Total</b>				<b>1,883</b>	



## WMI Student Enrollment (2006-2019)



## DEGREE PROGRAMS WITH WMI CERTIFICATES

- Animal Science
- Agricultural Education
- Agricultural Economics
- Architectural Engineering
- Biology
- Biological Engineering
- Business Administration
- Chemical Engineering
- Chemistry
- Civil Engineering
- Computer Science
- Curriculum & Instruction
- Construction Mgmt. & Safety
- Economics
- Electrical Engineering
- History
- Family and Consumer Sciences
- Industrial Systems Engineering
- Liberal Studies
- Journalism and Mass Communication
- Mathematics
- Mechanical Engineering
- Nursing
- Natural Resources
- Physics
- Political Science
- Sociology/Social Work

## Interdisciplinary Waste Management Institute (WMI)

# CERTIFICATE TRACKS

### **Animal Science**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)

WMI 333 1 cr. hr. capstone (**required for WMI  
Certificate**)

Sophomore Standing

LASC 261 (3 cr. hrs)

ANSC 413 (2 cr. hrs)

LASC 436 (3 cr. hrs)

ANSC 637 (3 cr. hrs)

ANSC 641 (3 cr. hrs)

WMI 429-40 hr Hazmat Training (3 cr. hrs)

18-20 credit hours for WMI Certificate.

### **Architectural Engineering**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)

WMI 333 1 cr. hr. capstone (required for WMI Certificate)

Sophomore Standing

AREN 343/344 (3 cr. hrs)

AREN 348 (3 cr. hrs)

AREN 382 (3 cr. hrs)

CAEE 436 (3 cr. hrs)

CAEE 481 (3 cr. hrs)

WMI 429-40 hr Hazmat Training (3 cr. hrs)

18-20 credit hours for WMI Certificate

### **Biological Engineering**

**(Focus on Renewable Energy Waste To Energy)**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)

WMI 333 1 cr. hr. capstone (required for WMI Certificate)

Sophomore Standing

BIOE 216 (3 cr. hrs)

BIOE 320 (3 cr. hrs)/or ENVS 422

BIOE 423 (3 cr. hrs)

BIOE 360 (3 cr. hrs)

BIOE 434 (3 cr. hrs)

WMI 429-40 hr Hazmat Training (3 cr. hrs)

18-20 credit hours for WMI Certificate.



### **Biology**

WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
BIOL 221 (4 cr. hrs) or BIOL 200 (3 cr. hrs—Focused Biodegradation Research)  
BIOL 410 (4 cr. hrs)  
WMI 417 Ethics (2 cr. hrs)/or BIOL 468 (3 cr. hrs)  
BIOL 480 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate. This added value training will make science simple for Biology students for informing society.

### **Chemistry**

WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
CHEM 221 (4 cr. hrs)  
CHEM 290/291 (3 cr. hrs)  
WMI 417 Ethics (2 cr. hrs)  
CHEM 390 (2 cr. hrs)  
CHEM 411 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate. This added value training will make science simple for Biology students for informing society.

### **Chemical Engineering**

WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
CHEN 320 (3 cr. hrs)  
CHEN 400 (3 cr. hrs)  
CHEN 415 (3 cr. hrs)  
CHEN 448 (3 cr. hrs)  
CHEN 422 (3 cr. hrs)/ or CHEN 430 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Civil Engineering**

WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
CIEN 212 (2 cr. hrs)  
CIEN 313 (1 cr. hr)  
CAEE 330 (3 cr. hrs)  
CIEN 350 (3 cr. hrs)  
CIEN 412 (3 cr. hrs)  
CIEN 483/484 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Construction Management**

WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
CM 214/224 (3 cr. hrs)  
CM 320 (3 cr. hrs)  
CM 448 (3 cr. hrs)  
CM 401 (3 cr. hrs)  
CM 412 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Electrical Engineering**

#### **(Focus on Renewable Energy Waste To Energy)**

WMI 236 1 cr. hr. Recycling Design Thinking (Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
ECEN 320 (3 cr. hrs)  
ECEN 460/466 (4 cr. hrs)  
ECEN 461 (3 cr. hrs)  
ECEN 478 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Environmental Health and Safety (EHS) Students**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
EHS 214 (3 cr. hrs)  
EHS 316 (4 cr. hrs)  
EHS 394 (3 cr. hrs)  
EHS 415 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Food Science Students**

WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
FCS 440 (3 cr. hrs)  
FCS 441 (4 cr. hrs)  
WMI 417 Ethics (2 cr. hrs)  
FCS 445 (3 cr. hrs)  
FCS 455 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Industrial Engineering**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
ISEN 260 (3 cr. hrs)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
WMI 417 Ethics (2 cr. hrs)  
ISEN 425 (3 cr. hrs)  
ISEN 471 (3 cr. hrs)  
ISEN 495 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Liberal Studies**

**(1 class at a time)**

#### **ENVS 201.01 (Scientific Reasoning)**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
WMI 333 1 cr. Hr. capstone (required for WMI Certificate)  
Sophomore Standing  
LIBS 243 (3 cr. hrs)  
WMI 417 Environmental Ethics (2 Cr. hrs)  
WMI 419 Environmental Justice (3 cr. hrs)  
LIBS 321 (3 cr. hrs)  
LIBS 330 (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Mechanical Engineering**

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
WMI 333 1 cr. hr. capstone (required for WMI Certificate)  
Sophomore Standing  
MEEN 202 (1 cr. hr)  
MEEN 232 (3 cr. hrs)  
MEEN 260/261 (3 cr. hrs)  
MEEN 321 (3 cr. hrs)  
MEEN 343 (3 cr. hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Nursing Students**

WMI 333 1 cr. Hr. capstone  
(required for WMI Certificate)  
Sophomore Standing  
WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
NURS 320 (3 cr. hrs)  
NURS 355 (3 cr. hrs)  
NURS 368 (4 cr. hrs)  
NURS 461 (4 cr. hrs)  
NURS 464/WMI 429-40 hr Hazmat Training  
(3 or 4 cr. hrs)  
18-20 credit hours for WMI Certificate.

### **Psychology**

ENVS 201 (3 cr. Hrs.) Scientific Reasoning  
PSYC 225 (3 cr. hrs) Social Psychology  
WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)  
WMI 333 1 cr. Hr. capstone  
(required for WMI Certificate)  
Sophomore Standing  
PSYC 373 (3 cr. hrs) Forensic Psychology  
*Important for Environmental Crimes*  
MI 417 Environmental Ethics (2 Cr. Hrs)  
WMI 429-40 hr Hazmat Training (3 cr. hrs)  
PSYC 494 Ind. Research 3 Cr. Hrs  
18-20 credit hours for WMI Certificate.

### Sociology

#### ENVS 201 (3 cr. hrs – Scientific Reasoning)

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)

WMI 333 1 cr. Hr. capstone  
(required for WMI Certificate)

Sophomore Standing

SOCI 203 (3 cr. hrs)

WMI 417 Environmental Ethics (2 Cr. hrs)

WMI 419 Environmental Justice (3 cr. hrs)

SOCI 412 (3 cr. hrs)/ or SOCI 310 (3 cr. hrs)

SOCI 204 (3 cr. hrs)

18-20 credit hours for WMI Certificate.

### Social work

#### ENVS 201.01 (3 cr. hrs - Scientific Reasoning)

WMI 236 1 cr. hr. Recycling Design Thinking  
(Sophomore Standing)

WMI 333 1 cr. Hr. capstone  
(required for WMI Certificate)

Sophomore Standing

SOWK 315 (3 cr. hrs)

WMI 417 Environmental Ethics (2 Cr. hrs)

WMI 419 Environmental Justice (3 cr. hrs)

WMI 429-40 hr Hazmat Training (3 cr. hrs)

SOWK 618 (3 cr. hrs)

18-20 credit hours for WMI Certificate.



WMI Round Table



Design Round Table

## WMI CERTIFICATE ADMINISTRATIVE POLICIES AND PROCEDURES

### Application Guideline for Interdisciplinary Waste Management Certificates

*“Global, national and local concerns for environmental problems and waste management issues present an opportunity and a challenge for the University to mobilize academic resources and capabilities for developing solutions” - Godfrey A. Uzochukwu, Ph.D.*

### WMI certificates “Highlights the training of NC A&T students in Waste Management and Environmental Security Issues”

- Students must complete an application in order to receive the certificates. Students will receive the certificate at a special ceremony upon the completion of their undergraduate degree requirements. Students must reapply for WMI certificates if they did not complete all graduation requirements.
- To earn an interdisciplinary undergraduate certificate in waste management, students must complete a minimum of 18 credit hours of approved waste management/related courses including a capstone seminar, and have a minimum GPA of 2.0.
- To earn an advanced interdisciplinary certificate in waste management graduate students must complete a minimum of 12 credit hours (six hours of thesis and six hours of advanced environmental course work) including a capstone seminar and have a minimum GPA of 3.0.

### Award of Interdisciplinary Waste Management Certificates

The procedure for the award of certificates which was endorsed by the Administrative Council of the Division of Academic Affairs are outlined below:

- Students will complete applications and submit to the WMI director by the deadline.
- The WMI director will screen applications, compile a list of qualified students and forward the list to the provost office and office of the registrar through the dean.
- Interdisciplinary Waste Management Certificates are awarded to students on the eve of commencement at a special ceremony.
- The names of students receiving certificates are listed in the commencement program.





NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY  
INTERDISCIPLINARY WASTE MANAGEMENT INSTITUTE

**APPLICATION FOR A WASTE MANAGEMENT CERTIFICATE**

“Highlighting your training in Waste Management and Environmental Issues”

Name: \_\_\_\_\_  
Type/Print full given name which will appear on your certificate

Banner Number: \_\_\_\_\_ College: \_\_\_\_\_

Department: \_\_\_\_\_ Major: \_\_\_\_\_

Degree \_\_\_\_\_ Date Completed/Expected \_\_\_\_\_

Have you taken/enrolled in WMI 333 Capstone? \_\_\_\_\_ Yes \_\_\_\_\_ No

Have you applied for graduation? \_\_\_\_\_ Yes \_\_\_\_\_ No

**Students will receive the certificate at a special ceremony upon the completion of the undergraduate degree requirements. You must reapply for WMI Certificate if you fail to meet graduation requirements.**

I wish to complete the requirements for a waste management certificate:  
\_\_\_\_\_ Fall \_\_\_\_\_ Spring \_\_\_\_\_ First Summer \_\_\_\_\_ Second Summer

**A. List of Environmental/Waste Management related courses completed and in progress. WMI related courses are tailored to follow WMI certificate curriculum. Required Course – WMI 333 (Waste Management Capstone)**

Total Credit Hours: \_\_\_\_\_ GPA: \_\_\_\_\_

**B. Attach a one page typed statement of your Environmental/Waste Management experiences (internships, projects completed, volunteer work, etc.). Include how your major relates to Environmental and Waste Management.**

Web Search: Environmental Politics, Engineering, etc.

*I understand that to earn a certificate in waste management for the semester/summer indicated above, I must have completed a minimum of 18 credit hours of approved waste management/related courses including a capstone seminar, and have a minimum GPA of 2.0.*

Local Address: \_\_\_\_\_

Street/Apt.#. City and State/Zip Code

Local Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

Permanent Address: \_\_\_\_\_

Street/Apt.#, City and State/Zip Code

Home Phone Number: \_\_\_\_\_

Applicant Signature: \_\_\_\_\_

Waste Management Director Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Submit Completed Application When You Apply for Graduation**

# WASTE MANAGEMENT CERTIFICATES AWARDED

(1995-2019)

**2,246 students**



Mary Brown and Dr. Uzo



Dr. Uzo and JaCorey Patterson

# UNDERGRADUATE WASTE MANAGEMENT CERTIFICATE AWARDED

(1995-2020)

**1,963 students**



Dr. Uzo and Chiagozie Uzochukwu

<b>Year</b>	<b>Awarded</b>
1995	16
1996	46
1997	71
1998	70
1999	71
2000	78
2001	106
2002	178
2003	203
2004	188
2005	183
2006	85
2007	67
2008	62
2009	43
2010	65
2011	53
2012	68
2013	37
2014	33
2015	46
2016	30
2017	54
2018	41
2019	49
2020	20
<b>Total</b>	<b>1,963</b>

**Happy Graduates**



# GRADUATE STUDENTS ONLY

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY  
WASTE MANAGEMENT INSTITUTE

Application for the ADVANCED WASTE MANAGEMENT CERTIFICATE  
“Highlighting your advanced training in Waste Management and Environmental Issues”

Name: \_\_\_\_\_

Type/Print full given name which will appear on your certificate

Banner Id: \_\_\_\_\_

College: \_\_\_\_\_ Department: \_\_\_\_\_

Major: \_\_\_\_\_

Advanced Degree \_\_\_\_\_ Date Completed/Expected \_\_\_\_\_

Have you applied for graduation? Yes \_\_\_\_\_ No \_\_\_\_\_

Have you taken/enrolled in WMI 747 Capstone Seminar? Yes \_\_\_\_\_ No \_\_\_\_\_

**Students will receive the advanced certificate at a special ceremony upon the completion of the graduate degree. You must reapply for the advanced WMI Certificate if you fail to meet graduation requirements.**

I wish to complete the requirements for a waste management certificate in:

Fall \_\_\_\_\_ Spring \_\_\_\_\_ First Summer \_\_\_\_\_ Second Summer \_\_\_\_\_

**A.** List of Advanced Environmental/Waste Management courses completed and in progress in your major:

Required Course – WMI 747 (Advanced Waste Management Capstone)

**Advanced WMI related courses are tailored to follow advanced WMI certificate curriculum.**

Total Credit Hours : \_\_\_\_\_ GPA: \_\_\_\_\_

**B.** Thesis/Project Description

I understand that to earn an advanced certificate in waste management for the semester/summer indicated above, I must have completed a minimum of 12 credit hours (six hours of thesis and six hours of advanced environmental course work) including advanced waste management capstone seminar I and have a minimum GPA of 3.0.

Local Address: \_\_\_\_\_

Street/Apt.#, City and State/Zip Code

Local Phone Number: \_\_\_\_\_ E-mail Address \_\_\_\_\_

Permanent Address: \_\_\_\_\_

Street/Apt.#, City and State/Zip Code

Home Phone Number: \_\_\_\_\_

Applicant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Waste Management Director Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Submit Completed Application When You Apply for Graduation

# ADVANCED WASTE MANAGEMENT CERTIFICATES AWARDED (2002-2020)

## (280 students)

Implemented in 2001

2002	10
2003	3
2004	5
2005	11
2006	19
2007	13
2008	24
2009	15
2010	7
2011	23
2012	19
2013	9
2014	12
2015	10
2016	13
2017	17
2018	11
2019	12
2020	7
<b>Total</b>	<b>280</b>



Dean Mohamed Ahmedna



Advanced WMI Scholars



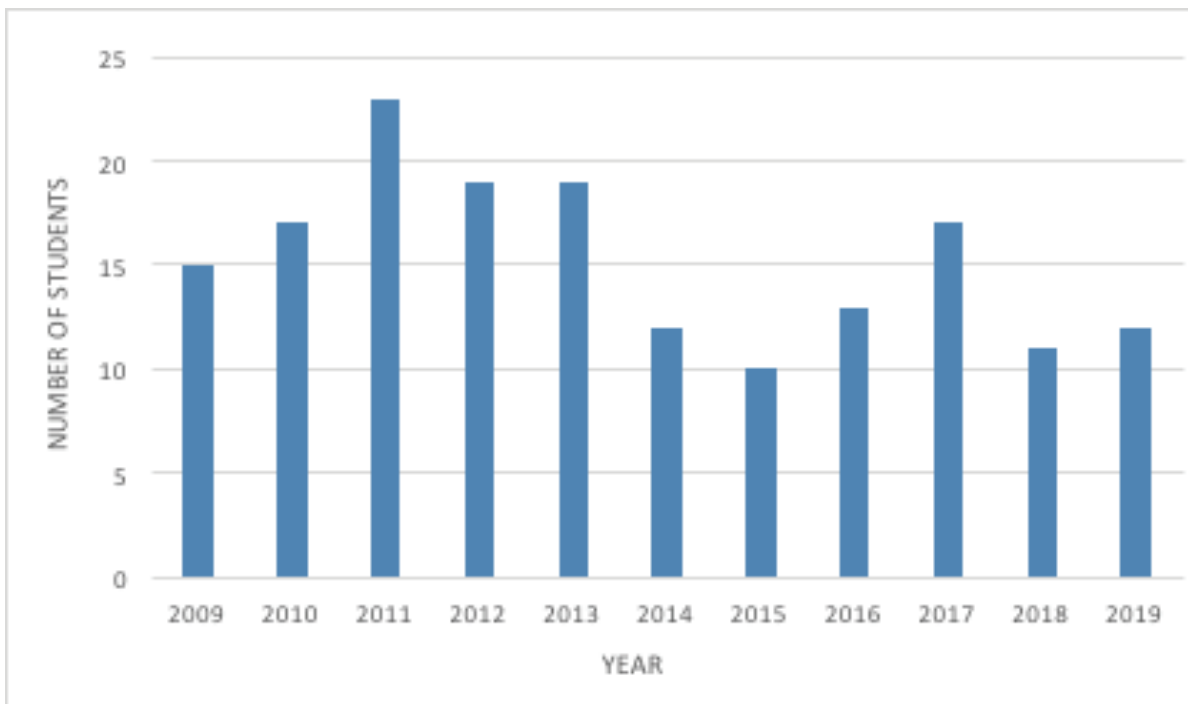
World Class Faculty and Administrators



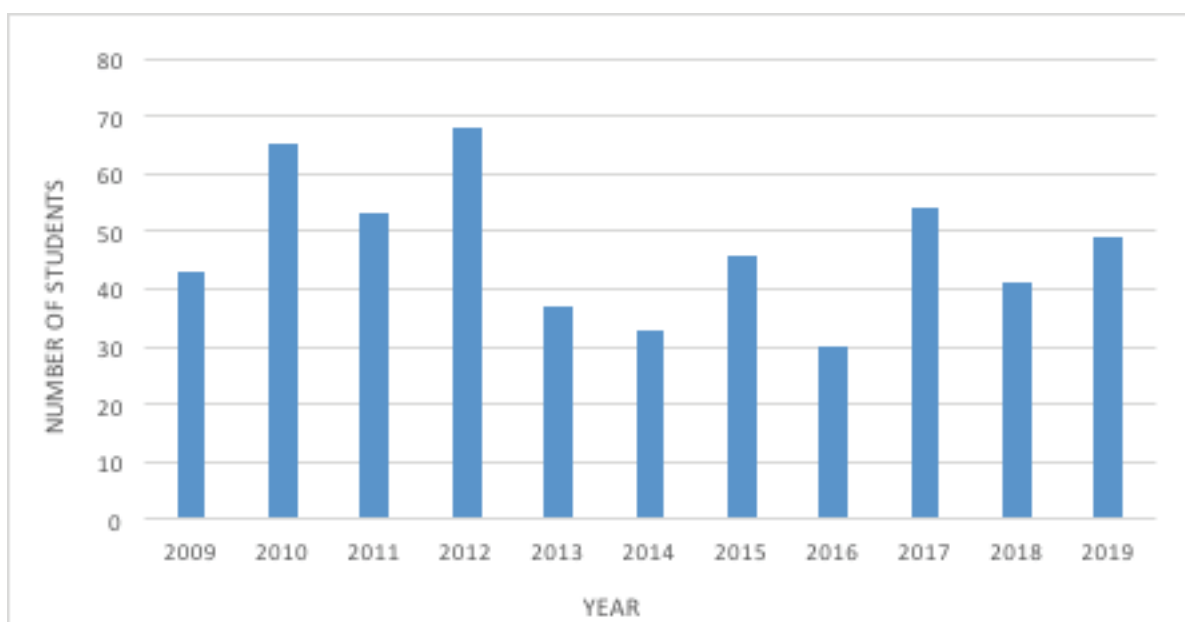
World Class Faculty



## Advanced Waste Management Certificates Awarded (2009-2019)



## Undergraduate Waste Management Certificates Awarded (2009-2019)



## Career Paths for Graduates Who Received the WMI Certificates

### MAJOR

Animal Science  
Biology  
Business  
Chemistry  
Communication  
Construction Management  
Criminal Justice  
Economics  
Education  
Environmental Studies/Science  
Engineering  
Journalism  
Landscape Architecture  
Mathematics  
Nursing  
Occupational Safety and Health  
Other  
Physics  
Political Science  
Psychology  
Sociology  
Social Work

### CAREER PATH

Environmental Animal Health and Specialist  
Environmental Biology  
Environmental Business  
Environmental Chemistry  
Environmental Communication  
Environmental Safety  
Environmental Crimes  
Environmental Economics  
Environmental Education  
Environmental Scientists/Consultants/Specialists  
Environmental Engineering  
Environmental Journalism  
Environmental Design/Visual Resource Specialist  
Environmental Mathematics/Statistics  
Environmental Health/Occupational Safety  
Environmental Safety  
Environmental Consultants  
Environmental Physics  
Environmental Policy/Politics  
Environmental Psychology  
Environmental Sociology  
Environmental Social Justice

*"... Thank you for all that you do for so many students across the campus ..."*

*- Dr. Robin Cogger, Dean of Engineering*

*"You are doing a fantastic job with our students. The email from Brandon Williams attest the great work you are doing. Congratulations to you. Continue to be a beacon for our students..."*

*- Dr. McIver*

*"... Wow that really says a lot and is a testament to the importance of the WMI on our campus ..."*

*- Dr. Vereda King Williams*

*"...Hello Dr. Uzo...Great news for Brandon and strong endorsement for the WMI multi-disciplinary program..."*

*- Linda Florence Callahan, Ph.D*

**FACULTY IN THEIR OWN WORDS**



## Internships/Employment – Student Success

Several graduates have reported that the WMI certificate helped them to obtain internships and employment.

*“I believe that the only reason I landed this job is due to the training and knowledge that I gained through taking your classes and working closely with you. The employer saw that my resume had Waste Management and hazmat. They asked deeper questions about my experience in those fields. I wanted to thank you for giving me the opportunity that made me into the man I am today.”*

- Brandon Williams

*“... Just wanted to let you know the my internship is going well. I'm doing a lot of waste management ...”*

- Stephen Johnson

*“... I was with EPA for one year, thanks to you ...”*

- Melinda

*“... Hi! Just wanted to let you know that I have received notification that I have been accepted into the Ph.D. program at the University of Arkansas for the spring semester. Thank you for all of your support throughout the past few years ...”*

- Angela Hines

*“... I would just like to reiterate how much I enjoyed your Waste Management program last semester ... Had I have known how enjoyable it was I would have enrolled much sooner but everything happens for a reason ...”*

- Daniel

### STUDENTS IN THEIR OWN WORDS

*“... My boss said the reason I got the job was because he saw I had taken your class in your waste management program ...”*

- S. Ingram

*“... I'd like to encourage all students who pursue the Certificate in Waste Management to enjoy the experience, absorb the information and see the value in what they are learning in order to apply it when they graduate. The certificate in waste management was exactly the extra tool I needed to supplement my degree and become a well rounded environmental, health and safety professional ...”*

- K. Jefferies

*“... Thanks alot! I am working with the Department of Transportation, and right now I am done in Lumberton with the Construction Division. I will have to go to Raleigh in March or April to complete the training program. That is pretty much what I have been doing since graduation ...”*

- Brice

*“... Thanks to knowledge obtained at North Carolina A&T State University through the Integrated Waste Management and Sustainability program, I have received a promotion at my current job. Through obtaining both a certificate in Waste Management and Sustainability as well as a 40-hour Hazmat certificate allowed to set my application apart from the others in the competitive bidding for this position...”*

- Miranda Jackson

## INTERDISCIPLINARY GRADUATE ENVIRONMENTAL CERTIFICATE PROGRAM

The Interdisciplinary Graduate Environmental Certificate program is a partnership involving five colleges: The College of Agriculture and Environmental Sciences, College of Engineering, College of Science and Technology, College Health and Human Sciences, College of Arts, Humanities and Social Sciences. The Interdisciplinary graduate environmental certificate is under the leadership of College of Agriculture and Environmental Sciences with oversight of certificates in WMI and home colleges by designated certificate coordinators. The purpose of this interdisciplinary program is to increase graduate college enrollment.



**WMI Certificate Ceremony**  
Chancellor Harold Martin Sr., Dr. Linda Callahan and Dr. William Randle (l-r table), Dr. Godfrey Uzochukwu, Dr. Joe Whitehead and Dr. Barry Burke (l-r)

### Interdisciplinary Graduate Environmental Certificate Tracks

#### **Environmental Engineering (15 Credit Hours)**

Students will learn the application and understanding of technical skills needed to solve infrastructure issues and knowledge of mathematical modeling for systems thinking.

#### **Environmental Sciences (15 Credit Hours)**

Students will be exposed to applications and understanding of environmental regulations, risk assessment, environmental impacts, social and economic impact on humans and knowledge of pollutant measurements and interpretations.

#### **Environmental Justice (15 Credit Hours)**

Knowledge of social justice dynamics and being aware of what the policies are (local, state, federal), public policy that impact environmental decision making, economic activity and environment, history of environmental justice and ethical considerations of environmental decision making.

#### **Environmental Health and Safety (15 Credit Hours)**

Knowledge of health and safety challenges in the workplace, home and public spaces, chemical, physical, biological hazards and their controls, toxicological impacts of exposure to hazards and environmental regulations.

### Interdisciplinary Committee Members

Michael Atkinson, Ph.D.

Mechanical Engineering

Omar Basha, Ph.D.

Chemical and Bio Engineering

Renzun Zhao, Ph.D.

Civil Engineering

Gregory Goins, Ph.D.

Natural Resources and

Environmental Design

Godfrey Ejimakor, Ph.D.

AgriBusiness

George Robinson, Ph.D.

Psychology

Alesia Ferguson, Ph.D.

Built Environment

Godfrey Uzochukwu, Ph.D.

WMI (Team Leader)



# B. WMI Research

The faculty at N.C. A&T is committed to both interdisciplinary and multidisciplinary environmental and waste management research. Research activities are conducted in laboratories to complement instructional and outreach programs.



**Four universities will help establish center funded by largest research grant received by UNC System**

During a press conference held last month, University of North Carolina (UNC) officials announced the receipt of an \$18 million grant from the National Science Foundation to establish a new Science and Technology Center (STC). It is the largest research grant the UNC System has ever received, and North Carolina A&T State University will be a part of the endeavor.

A&T, UNC-Chapel Hill, North Carolina State University (NCSSU) and the University of Texas-Austin, have been selected to participate in a project that will help to make industry more environment friendly.

Dr. Earnestine Palmonds, vice chancellor for research at A&T, said the university is pleased to participate and contribute the use of its faculty toward this effort.

"A&T already has a strong program in energy and environmental research, combining the expertise of faculty in the Waste Management Institute, Center for Environmental Remediation and Pollution Prevention, and others from chemical engineering," Palmonds added.



Dr. Godfrey Uzochukwu (left), Dr. Joseph M. DeSimone (center) and Dr. Earnestine Palmonds (right) discuss the \$18 million grant the University of North Carolina System received from the National Science Foundation to establish a new Science and Technology Center. Uzochukwu is director of the Natural Resources/Waste Management Institute and a professor at A&T who will participate in the project. DeSimone, a William R. Kenan Jr. Distinguished Professor at UNC-CH and NCSU, will direct the center. Palmonds is vice chancellor for research at A&T.

16-campus UNC System," DeSimone said. "An estimated \$18 million will come from the National Science Foundation over a five-year period to support the \$24 million center faculty."

According to DeSimone, the new STC will be the leading facility in the world dedicated to discovering environmentally friendly processes using alternative solvents. It will build on the pioneering research already done by the center.

significantly reducing the amount of organic and water wastes generated in the manufacture of polymers and chemicals, in painting, cleaning and coating operations and in producing textiles and paper products," DeSimone said.

Palmonds said that the Center will greatly enhance A&T's capabilities and enable it to contribute further to knowledge and economic development for

"The algorithm used to design this research and at the same time engage in workforce preparation for workforce diversity and economic development," Palmonds added.

A&T professors who will participate in the project are Dr. Ilias, Dr. Kenneth Roberts, Dr. Yusef Alewuyi and Dr. Godfrey Uzochukwu.



# WMI Research Areas

## Converging Approaches for Effective Environmental and Waste Management Solutions

Development of effective environmental and waste management solutions requires converging approaches such as the integration of knowledge from air, water, energy, infrastructure, climate and education. Search for solutions must draw upon innovative ideas from different disciplines.



Undergraduate student researcher Nallah Muhammad and Dr. Uzo at National Atmospheric Deposition Site at N.C. A&T



Graduate student researcher Daniel Obiri and Nallah Muhammad at National Atmospheric Deposition Site at N.C. A&T

## WM Convergence Research Teams

### Education and Infrastructure

- Godfrey Uzochukwu, Ph.D. (Leader)
- Stephanie Luster-Teasley, Ph.D.
- George Robinson, Ph.D.

### Waste Management

- Renzun Zhao, Ph.D. (Leader)
- Godfrey Uzochukwu, Ph.D.
- Arnab Bhowmik,
- Abolghasem Shahbazi, Ph.D.
- Niroj Aryal, Ph.D. (Co-leader)

### Bio Energy

- Abolghasem Shahbazi, Ph.D. (Leader)
- Lijun Wang, Ph.D.
- Godfrey Uzochukwu, Ph.D.

### Global Climate

- Ademe Mekonnen, Ph.D. (Leader)
- Omar Basha, Ph.D.
- Godfrey Uzochukwu, Ph.D.
- Manoj Jha, Ph.D.
- Arnab Bhowmik, Ph.D.
- Solomon Bililign, Ph.D.

### Soil, Air and Water Quality

- Manoj Jha, Ph.D. (leader)
- Godfrey Uzochukwu, Ph.D.
- Arnab Bhowmik, Ph.D. (Co-Leader)
- Solomon Bililign, Ph.D.
- Niroj Aryal, Ph.D.
- Renzun Zhao, Ph.D.





## **Collaborative Interdisciplinary Projects**

USDA – NIFA

**Drs. Ejimakor, Uzochukwu, English, Worku et al**

Generating Course Impact Multipliers with Online and Distance Education Courses

**(\$149,000)**

**Drs. Aryal, Wang and Uzochukwu** Enhanced teaching and learning of ecological engineering science and data science using hands-on and project-based learning strategies

**(\$150,000)**

**Drs. Goins, Uzochukwu et al**

“Building Diverse and Integrative STEM Continua Using Socio-environmental Systems In and Out of Neighborhoods-DISCUSSION”

**(\$300,000)**



WM Related Projects – DORED

**\$11 million in the past three years**

## **SUMMARY WM Research Productivity**

**\$6,818, 959**

32 publications

4 Books

**Faculty Affiliates – Past 10 Years**

**Manoj K. Jha, Ph.D.**

**\$3.2 million**

74 publications

---

**Niroj Aryal, Ph.D.**

\$711,221; 12 publications

**Renzun Zhao**

\$104, 525

**Arnab Bhowmik, Ph.D.**

\$2 million; 14 publications

**Solomon Bililign, Ph.D.**

\$1.5 million; 12 publications

**Abolghasem Shahbazi, Ph.D.**

\$10 million; 101 publications

**Omar Basha, Ph.D.**

\$100,000; 5 publications

**Ademe Mekonnen, Ph.D.**

\$2.2 million; 15 publications

## National Atmospheric Deposition Program (NADP)

N.C. A&T's N.C. 17 NADP site continues to track atmospheric deposition and its effects on the ecological systems. N.C. 17 site operates two monitoring networks (the National Trends Network, NTN) and Mercury Deposition Network (MDN). NADP data is critical to public safety, ecosystem services and environmental policies. N.C. A&T students are the site operators.

N.C. 17 is the only station at an HBCU.

## WMI FUNDING HISTORY GRANTS & CONTRACTS

- **2015 – 2018**  
National Atmospheric Deposition (US Department of Energy) **\$211,000**
- **2012-2013**  
Increasing Capacity in Environmental Areas of Mathematics, Science, Engineering, Technology, and Workforce Diversity (US DOE) **(\$300,000)**
- **2009-2012**  
Support for Waste Management US DOE) **(\$450,000)**
- **1998 - 2004**  
Assessment and Evaluation of Technologies for Environmental Restoration (USDOE) **(\$205,552)**
- **1999 - 2007**  
Support For Energy And Environmental Studies Program (USDOE) **(\$1,065,000)**
- **1999-2004**  
NSF STC \$18 Million (UNC-CH, NCSU, UT Austin and A&T **(\$1.9 Million A&T Subcontract)** Role: PI and Outreach Leader
- **2002**  
National Environmental Conference **(\$44,000)** ERDA/DOE-SRS (PI)
- **2000-2001**  
Technical Support of Hydrology, Natural Attenuation and Risk Assessment **(\$150,000)**
- **1999-2000**  
Technical Support for Monitored Natural Attenuation **(\$62,500 ERDA (PI)**
- **1999**  
American Geological Institute Scholarship (PI) **\$3,000** USDOE-SRS (PI)
- **1995-2009**  
Infrastructure Support for a Waste Management Institute **(\$1.4 million)**
- **1997-1998**  
Assessment and Evaluation of Environmental Technologies **(\$250,000)**

■ **SUMMARY**  
**Total Grants and  
Contracts Received**  
**\$6,141,052**

**Title III**  
**\$677,907**

**28 Publications**

## Collaborative Inter-institutional NSF Funding (1999-2004)

### ENVIRONMENTAL SOLVENTS AND PROCESSES

**\$18 million**

Joseph DeSimone – UNC- CH (PI)  
Reuben Carbonell – NC State Co-PI)  
Keith Johnston – UT Austin  
V. Kabadi – N.C. A&T

#### Investigators:

G. Uzochukwu – N.C. A&T (Leader)  
S. Ilias – N.C. A&T  
K. Roberts – N.C. A&T  
Y. Adewuyi – N.C. A&T



Dr. Uzo with his colleagues at a NCSE conference

## Collaborative Interdisciplinary Projects

USDA – NIFA

#### Drs. Ejimakor, Uzochukwu, English, Worku et al

Generating Course Impact Multipliers with Online  
and Distance Education Courses (**\$149,000**)

#### Drs. Aryal, Wang and Uzochukwu

Enhanced teaching and learning of ecological  
engineering science and data science using  
hands-on and project-based learning strategies  
(**\$150,000**)

#### Drs. Goins, Uzochukwu et al

“Building Diverse and Integrative STEM Continua  
Using Socio-environmental Systems In and Out of  
Neighborhoods-DISCUSSION” (**\$300,000**)

#### WM Related Projects – DORED

**\$11 million in the past 3 years**



## C. WMI SERVICE/OUTREACH

### Precollege STEM Environmental Security – 876 students impacted

Pre-College Workshop on Environmental Security, Sustainability and Waste Management was conducted for 876 public school students and teachers. The theme of the workshop was “Environmental Security and Waste Management” highlighting challenging environmental security, sustainability and waste management questions.



JaCorey Patterson on designing plastic products at Bluford Stem Academy



# Global Environmental Outreach – Nigeria

Environmental Sustainability for High School Students – 2018



Workshops on Sustainable Infrastructure, Energy and Power, Transportation, Water Conservation, Waste Management and Education were conducted for students and teachers in Nigeria in June 2018. Students and teachers were encouraged to daily activities



## UI GreenMetric University Sustainability Ranking

For five consecutive years 2013, 2014, 2015, 2016 and 2017, UI World GreenMetric Ranking listed N.C. A&T in the top 7% overall for university sustainability. <http://greenmetric.ui.ac.id/>

**Ranked 4th in USA  
and 14th in the World  
(619 Universities)**



GreenMetric ranking results were computed from information provided by universities online survey under six categories — infrastructure, energy and climate change (21%), waste management (18%), water usage (10%), transportation (18%) and education (18%).

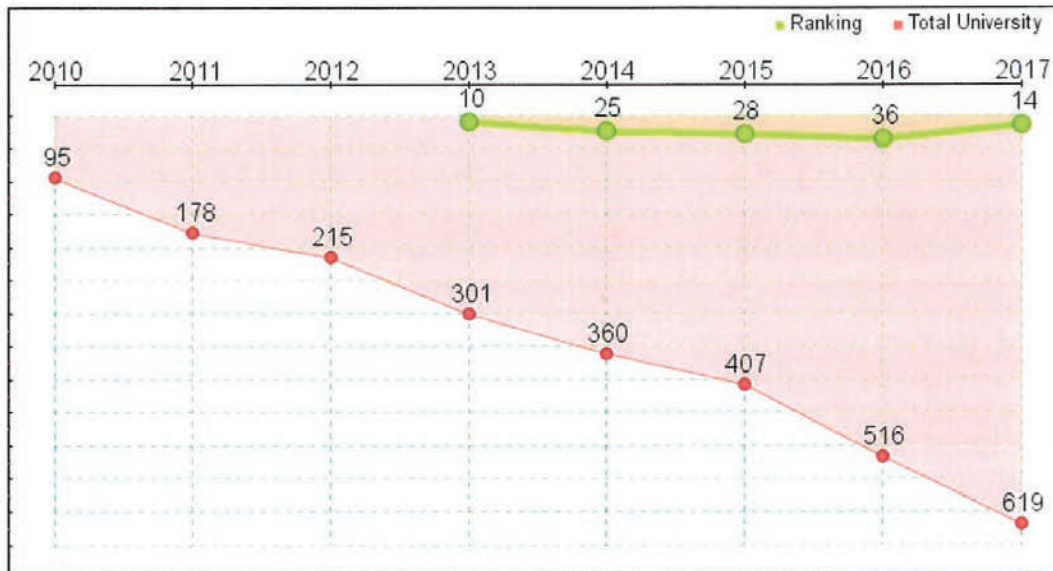




## ■ Result Summary



### World Rankings History



## COMMUNITY ENGAGEMENT

### WMI partners with the City of Greensboro's Solid Waste Management Commission

To review and develop recommendations for long-term sustainable waste management, waste reduction and recycling options.

### Cape Fear River Assembly

WMI partners with Cape Fear River Assembly. Cape Fear River is the largest and most industrialized river system in North Carolina and has tributaries in 29 of 100 counties. The Cape Fear River Basin extends from the headwaters of North Greensboro to the river's mouth in Southport. Twenty-seven percent of North Carolina's population live within the Cape Fear River Basin.

### WMI External Partnerships (Big Ideas and New Perspectives)

- **Ramboll/O'Brien & Gere Ltd.**  
Mike Hall
- **Waste Industries USA**  
David Pepper
- **Environmental Protection Agency**  
Hillary Ward
- **City of Greensboro**  
Dale Wyrick
- **University of Indonesia**  
(UI GreenMetric Ranking)
- **University of Nigeria**  
Environmental Sustainability
- **Hackley and Associates**  
Lloyd Hackley
- **Peace Corps**  
Chris Cardona
- **Environmental Protection Agency**  
Toni Jones
- **IBM**  
Xavier Montgomery Lee
- **National Council for Science & Environment**



City Council official and Dr. Uzo at a National Symposium held at N.C. A&T



Former Chancellor James Renick, Dr. Uzo and Dr. Ilias (l-r) at a National Environmental conference at Grandover Resort

# NATIONAL CONFERENCE ON ENVIRONMENTAL SCIENCE AND TECHNOLOGY

**National Conference on Environmental Science & Technology – 4**  
1998, 2002, 2007 and 2013

**National Environmental Symposium – 1**  
1996

**National Environmental Expo - 1**  
1997



Topics include environmental regulations, groundwater remediation, waste to energy, climate change, resource economics, environmental justice, fate and transport of contaminants, food bio-processing, sustainable energy, water resources and innovative environmental technologies. More the 4,000 chapters in the four books are downloaded globally per year.

Dr. Uzo receiving a Professional Certificate for Campus Sustainability Leadership at University of Vermont



## SUSTAINABILITY LEADERSHIP AT N.C. A&T



Chancellor Emeritus Edward B. Fort at the 1998 National Conference on Environmental Science and Technology.



From left: Chancellor Emeritus Edward Fort and National Environmental Conference attendees

North Carolina Agricultural and Technical State University has a history of providing leadership in addressing sustainability issues such as infrastructure, energy and climate change, waste management, water usage, transportation and education through Colleges, Facilities Department, Budget Office, Division of Research and Economic Development, Campus Enterprise, Office of Strategic Planning and Institutional Effectiveness, University Farm and Interdisciplinary Waste Management Institute (WMI). These collaborations have made the university a major contributor to understanding sustainability on a global scale. The university has taken advantage of Higher Education Sustainability Bill (The Higher Education Opportunity Act-P.L. 110-315) signed by President George W. Bush in 2008. In March 2011, Chancellor Harold Martin Sr. launched a robust sustainability program and encouraged everyone to integrate sustainability into their daily operations.

# UNC TOMORROW – ENVIRONMENT WORKGROUP ENVIRONMENT WAS IDENTIFIED AS A PRIORITY IN NC

- Godfrey Uzochukwu, Director, Waste Management Institute – Chairman
- Keith Schimmel, Director, Ph.D. in Energy and Environmental Studies
- Shoou-Yuh Chang, Professor, Civil and Environmental Engineering
- Andrew Small, Director, Environmental Health and Safety
- Abolghasern Shahbazi, Professor and Director, Biological Engineering
- Carey Baldwin, Director, Physical Plant
- Robert L. Powell, Assistant Professor, Architectural Engineering
- Harmohindar Singh, Professor, Architectural Engineering
- Regina Williams, Assistant Professor



**1998 Earth & Environmental Science/WMI Graduate – Hon. Michael Reagan, NC Environmental Quality Secretary with his mentor, Professor Uzochukwu at confirmation hearing**

# UNIVERSITY RECYCLING COMMITTEE

- Mr. Carey Baldwin, (Co-Chair) Physical Plant Director
- Dr. Godfrey Uzochukwu, Director, (Co-Chair) Waste Management Institute
- Dr. Linda Callahan, Chair, Faculty Senate
- Dr. Elham Fini, Assistant Professor, Civil Engineering
- Ms. Shalane Griffin, Facilities Recycle Manager
- Dr. Tanya Hargett, Research Compliance Officer
- Ms. Samantha Hargrove, Communication Specialist, University Advancement
- Mr. John Hylton, Biological Engineering Student
- Ms. Linda Inman, Director, Housing and Residence Life
- Ms. Vanessa Largent, Police and Public Safety
- Ms. Sharon Mitchell, Chair, Staff Senate
- Mr. Lee Morgan, Associate Director, Student Development, Student Affairs
- Mr. Christian Robinson, Student Government Association President
- Ms. Louisa Thomas, Environmental Health & Safety



WNAA Radio Outreach – Drs. Uzo and Callahan with Mabel Scott of University Relations



WMI capstone seminar presenters



# NATIONAL COUNCIL FOR SCIENCE AND ENVIRONMENT UNIVERSITY NETWORK

## NCSE MEMBER INSTITUTIONS

### COLLEGE AND UNIVERSITY NETWORK

Adelphi University  
 Alabama A&M University  
 Antioch University New England  
 Arizona State University  
 Arkansas State University  
 Ball State University  
 Bard College  
 Bentley University  
 Boston College  
 Boston University  
 California State University, Chico  
 Central Michigan University  
 Chatham University  
 Clarkson University  
 Colby College  
 Colgate University  
 Colleges of the Fenway  
 Colorado State University  
 Columbia University  
 Dartmouth College  
 Dickinson College  
 Doane University  
 Duke University  
 Duquesne University  
 Fairfield University  
 Florida International University  
 Franklin & Marshall College  
 George Mason University  
 Georgia State University  
 Goshen College  
 Heritage University  
 Indiana University  
 Iowa State University  
 Lehigh University  
 Long Island University  
 Louisiana State University

Loyola University New Orleans  
 Macalester College  
 Manhattan College  
 Massachusetts Institute of Technology  
 Michigan State University  
 Middlebury College  
 Moravian College  
 New College of Florida  
 New York Institute of Technology  
 North Carolina A&T State University  
 North Carolina State University  
 Northeastern University  
 Northern Arizona University  
 Oberlin College  
 Purdue University  
 Rutgers University  
 Salisbury University  
 Sewanee: The University of the South  
 Siena College  
 Smith College  
 Southern New Hampshire University  
 St. Mary's College of Maryland  
 State University of New York College of Environmental Science and Forestry  
 Texas A&M University  
 The Evergreen State College  
 The George Washington University  
 The Ohio State University  
 The Pennsylvania State University  
 The University of Alabama  
 The University of Arizona  
 The University of New Hampshire  
 The University of Rhode Island  
 The University of Texas at El Paso  
 The University of Texas Rio Grande Valley  
 The University of Toledo  
 The University of Vermont

Tri-Co: Bryn Mawr College, Haverford College, and Swarthmore College  
 Tufts University  
 Unity College  
 University of Alaska Fairbanks  
 University of Arkansas  
 University of California, Davis  
 University of California, Merced  
 University of California, San Diego  
 University of Colorado Boulder  
 University of Dayton  
 University of Delaware  
 University of Findlay  
 University of Hawai'i: Mānoa, Hilo, West O'ahu  
 University of Illinois: Urbana-Champaign, Chicago, Springfield  
 University of La Verne  
 University of Maryland Center for Environmental Sciences  
 University of Michigan  
 University of North Texas  
 University of Pennsylvania  
 University of Pittsburgh  
 University of Puerto Rico  
 University of Rochester  
 University of South Carolina  
 University of the District of Columbia  
 University of Wisconsin-Madison  
 Warren Wilson College  
 Wellesley College  
 Western Washington University  
 Williams College  
 Worcester Polytechnic Institute  
 Yale University

### COMMUNITY COLLEGE NETWORK

Bristol Community College  
 Brookhaven College  
 Cedar Valley College  
 Eastfield College  
 El Centro College  
 GateWay Community College  
 Hawai'i Community College

Honolulu Community College  
 Johnson County Community College  
 Kapi'olani Community College  
 Kaua'i Community College  
 Leeward Community College  
 Mountain View College  
 North Lake College

Northern Virginia Community College  
 Richland College  
 Saddleback College  
 Seminole State College of Florida  
 UH Maui College  
 Windward Community College

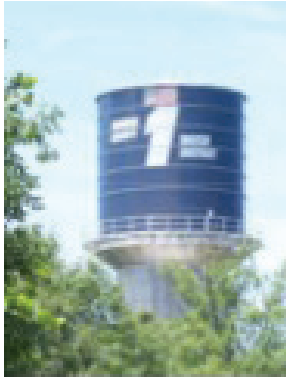
As of 5/10/2019

### INTERNATIONAL NETWORK

NCSE is launching the International Network in the 2019-2020 academic year for institutions based outside of the United States. Join NCSE to advance the use of science in environmental decision-making at a global level.

**Please contact [membership@ncseglobal.org](mailto:membership@ncseglobal.org) for more information.**

[www.NCSEGlobal.org](http://www.NCSEGlobal.org)



## **PARTNERSHIP WITH HARDIN COUNTY WATER DISTRICT NO. 1**

This partnership allows WMI to improve its programs and also serve as a collective source for information, networking and guidance for Fort Knox residents in Kentucky.

### **Fort Knox Military Base Public Environmental Campaign.**

The purpose of the Public Environmental Campaign was to enhance the education and training of current and future residents and employed persons on Fort Knox to protect the sewer system, and the environment, by not putting harmful chemicals including grease down the drain in their homes and places of business. The public environmental information campaign for current and future Fort Knox residents including school programs for students resulted in measurable decrease in grease and harmful chemicals accumulated in the sewer systems. This effort also resulted in decreased operating costs and better water quality discharged into the environment.



### **Examples of Grease Problems**

Improper disposal of grease causes sewer overflows, backups health hazards, damage to homes and to homes and the environment and expensive repairs.

The Earth and Environmental Science Club Presents

## **HBCU, What Will You Do?**

A central graphic featuring a globe surrounded by ten circular icons representing various scientific fields: a leaf, a microscope, a beaker, a planet, a DNA helix, a microscope, a leaf, a microscope, a beaker, and a planet.

Please join us for a panel discussion surrounding the interdisciplinary nature of sustainable living and the role we must play as an HBCU

**When: Wednesday, February 19, 2019**  
**Where: Carver Hall, room 104**  
**Time: 5:00pm- 6:30pm**





## **ACKNOWLEDGEMENT OF FORMER WMI STUDENT EMPLOYEES**

Monica Whitlock	Patrick Stanley
Charla Gaskins	Precious Hairston
Kevin Knight	Raheem Outlaw
Tammy McNeil-Rankin	Ronnie Blakeney
Tarcy Keyes	JaCorey Patterson
Amber Williams	Taylor Riley
Rebecca Kratz	Evelyn Miller
Chiamaka Umezulike	Keenan Thomas
LeAnn Rutledge	Janna Bailey
Lauren Davis	Jessica Leacock
Ryan Williams	Quinton Allison
LaKenya McNear	TashiYuanna Jones
Jasmine Patterson	Nolan Ratchford
Jesse Davis	Jadarius Martin
Reggie James	Alexis Keaton
Jillian Curry	Sherrod Long
Amina Dines	Brianna Providence
Kyle Hobson	Tochukwu Emeakaroha
Allyson Alston	Benjamin Imbolo
C Davis Powell	Acacia Hines
Furmore Gomez	Tamara Goode
Annissa Jeffries	Miranda Jackson
Timothy Foster	Quincey Moffitt

## **INTERDISCIPLINARY WMI PROGRAM IMPACT**

- Embed environmental and waste management in the curriculum
- Offer core courses to promote environmental sustainability
- Prepare students for Masters and Ph.D. training in environmental and related sciences, social sciences, law, business, humanities and engineering
- Adds value to their degree programs and enhances employment opportunities
- Make environmental and waste management a part of student's education
- Offer additional career paths for students
- Expose students to sustainability topics in lectures, laboratories, seminars
- Provide services (scholarships and internships) to students
- Leverage financial support to train undergraduate and graduate students
- Improve academic instruction by providing faculty development opportunities for faculty and staff to enhance their teaching and management skills
- Facilitate cooperation and communication among faculty from a wide range of disciplines
- Provide opportunity for students to collaborate in environmental/waste management activities
- Prepare students to participate in community environmental problem solving
- Inspires creation of interdisciplinary programs and centers
- Generates millions of dollars for the university





**NORTH CAROLINA AGRICULTURAL  
AND TECHNICAL STATE UNIVERSITY**

## **INTERDISCIPLINARY WASTE MANAGEMENT INSTITUTE PROGRAM COMPONENTS**



**ReuseReduceRecycle**

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email: [uzo@ncat.edu](mailto:uzo@ncat.edu)