

## Advanced Research Scholar – PhD Dissertation

### Reuben “Raven” Lingating, Jr.

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**Field of Study:**  
**Research Period**  
**US University**  
**US Professor**  
**Research Title**

*Biological Wastewater Treatment*  
*August 2016 – November 2017*  
*Wright State University*  
*Dr. Abinash Agrawal*  
*Aerobic Cometabolic Biodegradation of Trace Concentrations of Emerging Contaminants Carbamazepine and Diclofenac Using Ammonium-Oxidizing Bacteria and Methane-Oxidizing Bacteria*

#### Describe your research conducted in the US.

My research utilizes co-metabolism as a means of treating highly recalcitrant contaminants found in wastewater. The effectiveness of using methane-oxidizing bacteria, enriched from the roots of *Typha latifolia*, in treating carbamazepine and diclofenac is tested in the study. The process is somewhat optimized by varying initial concentrations of methane and the target contaminants.

#### What was the highlight of your research in the US?

The enrichment of a viable source of microbial community was particularly difficult, as certain conditions have led to several attempts to successfully enrich ammonia-oxidizing bacteria that was used for co-metabolic treatment of the contaminants. The very delicate nature of handling microorganisms has been emphasized during a majority of the research period.

#### In what way has the USAID scholarship changed you?

USAID has provided me the opportunity to be immersed in a research environment quite different from the one that I am already used to in the Philippines. I have gained new research techniques under my US professor's tutelage. Living in a foreign country has also reshaped my life perspectives, and has definitely tested my character as a researcher and as a person. I am simply a better version of myself because of the USAID scholarship.

#### How would you use the knowledge and skills gained through your research to contribute or influence economic growth in the country?

The wastewater treatment industry is a very vital part of our country's growing economy as it serves as an accessory to all other processing/manufacturing industries. Developing new techniques in improving wastewater treatment produces better water quality, positively affecting public and environmental health. The knowledge and skills that I gained through this research can be further used into developing more efficient biological techniques in treating wastewater: a scenario that is overall favored over physical and chemical treatment alternatives.

#### As a young scientist, what do you envision for the Philippine science, technology and innovation ecosystem in the next 10 years?

I envision the Philippine science, technology and innovation ecosystem to be more cohesive across all disciplines in the next 10 years. There are many fields of science and through collaborative action of researchers from these various fields, technological advancement will certainly come faster, leading to better inspired innovations.

*After returning to the Philippines and finishing his PhD degree in Environmental Engineering, Raven will work as a university professor and actively pursue further research endeavors.*

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