

# Ioanna Maria Spyrou

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## EMPLOYMENT

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Doctoral Research Fellow, Georgia Institute of Technology, School of Economics, Atlanta, GA, Aug 2019-

## EDUCATION

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### Ph.D. Economics

(Anticipated graduation 05/2024)

Dissertation Title: "Impact of Natural Disasters on Well-Being and Sustainable Agriculture as

Alleviation Strategy", Advisor: Dr. Shatakshee Dhongde

Georgia Institute of Technology

Atlanta, GA

### M.S. Economics

(Awarded May 2023)

Georgia Institute of Technology

Atlanta, GA

### M.A. Statistics Applied Mathematics

(Awarded: June 2017)

City University of New York

New York City, NY

### B.S. Mathematics

(Awarded: June 2014)

Aristotle University

Thessaloniki, Greece

### B.S. & M.S. Plant Protection Science

(Awarded: November 2008)

Aristotle University

Thessaloniki, Greece

## RESEARCH INTERESTS

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Sustainable Development, Development and Environmental Economics, Agriculture Economics, Data Science, Econometrics, Team Science

## PUBLICATIONS

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### In Progress:

- **Ioanna Maria Spyrou** (2023) Sustainable Agricultural Practices (SAPs) as determinants for food security. Job Market Paper

- Dhongde Shatakshee and **Ioanna Maria Spyrou** (2023) Impact of Drought on Children's Educational Outcomes

<https://dx.doi.org/10.2139/ssrn.4547663>

- Meghan McSorley, Bettina K. Arkhurst, Marjorie Hall, Yilun Zha, **Ioanna Maria Spyrou**, Katherine Duchesneau, Udit Ringania, Michael Chang (2023) For graduate students to become leaders in sustainability, we must transcend disciplinary boundaries Elementa: Science of the Anthropocene (revised, June 2023)

### Published Papers:

- **Ioanna Maria Spyrou**, Christos Frantzidis, Charalampos Bratsas, Ioannis Antoniou, Panagiotis D. Bamidis. (2016) Geriatric depression symptoms coexisting with cognitive decline: A comparison of classification methodologies, Biomedical Signal Processing Control, Vol. 25, pp 118-129

<https://doi.org/10.1016/j.bspc.2015.10.006>

- S. Billis, Evdokimos I. Konstantinidis, **Ioanna Maria Spyrou**, Panagiotis Antoniou, Panagiotis D. Bamidis. (2015) Exercise Intensity Forecasting: Application in Elderly Interventions that Promote Active and Healthy Aging. International Journal of E-Health Medical Communications, Vol. 6, Issue 4, pp 1-19

<https://doi.org/10.4018/IJEHMC.2015100101>

- **Ioanna Maria Spyrou**, Dimitrios G. Karpouzas, Urania Menkissoglu-Spiroudi. (2009) Do botanical pesticides alter the structure of the soil microbial community? Microbial Ecology, Vol. 58, Issue 4, pp 715-727 <https://doi.org/10.1007/s00248-009-9522-z>

## RESEARCH PAPERS

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### - **Sustainable Agricultural Practices (SAPs) as determinants for food security.**

March 2023

This paper examines household determinants for adopting sustainable agricultural practices and uses different food insecurity measures to identify household food conditions, suggesting that adopting Sustainable Agricultural Practices (SAPs) improves food security in a household. Among different SAPs, the two important ones are crop rotation, and mixed cropping. I include multiple food insecurity measures to obtain an integrated approach of the food situation in each household including Food Insecurity Experience Scale (FIES), Household Food Insecurity Access Scale (HFIAS) and Prevalence and Household Dietary Diversity Score (HDDS). According to the findings, adopting SAPs is affected by different factors depending on the practice and both SAPs are found to improve food security. Moreover, most important determinants for adopting SAPs are identified. Specifically, when head of the household can read or write and has attended school, as well as participation in extension programs increases the odds of adopting crop rotation. On the other hand, adopting mixed cropping is positively affected when the head of the household is male. My work suggests that both SAPs reduce food insecurity based on FIES and HFIAS Prevalence measures. Crop rotation leads to an up to 26 percent decrease of food insecurity. Additionally, HDDS is found to increase when mixed cropping is adopted.

### - **Impact of Drought on Children's Educational Outcomes.**

(with Dr. Shatakshee Dhongde), November 2022

Droughts have become more frequent and more intense in countries across the world. In this study, we assess the impact of droughts on children's well-being. We combine a rich panel data set on 2000 school-aged children with monthly rainfall data in Ethiopia between 2009 and 2017. We find that droughts decrease the probability that a child will remain enrolled in school by more than 36%. Among children who remain enrolled, droughts adversely affect their grade progression. These children suffered from high food insecurity. Girls, in particular, were at a greater risk of being malnourished and stunted. With the onset of a drought, children spent more time on paid activities and less time on sleep. Overall droughts had a significant negative impact on children's overall well-being.

### - **Food insecurity forecasting using Machine Learning Techniques.** July 2023

This paper is using machine learning techniques to forecast food insecurity in several countries in Africa aggregating data from 2019 to present. I am combining data on food insecurity with weather data including drought indices such as SPEI, conflict data, food prices data and NDVI data (GIMMS Global Agricultural Monitoring).

## RESEARCH EXPERIENCE

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### **Graduate Research Fellow**

Aug 2019 to July 2023

Georgia Institute of Technology, School of Economics, Brook Byers Institute of Sustainable Systems

#### **"Sustainable Agricultural Practices (SAPs) as determinants for food security":**

- Evaluated the impact of SAPs on food security.
- Examined four different food insecurity measures (Food Insecurity Experience Scale, Household Food Insecurity Access Scale and Prevalence, Household Dietary Diversity Score)
- Processed panel data using fixed effects estimation.

#### **"Impact of Drought on Children's Educational Outcomes":**

- Analyzed household data combined with climate data.
- Processed panel data using fixed effects estimation.

#### **"Sustainability: Interdisciplinary Teams and Leadership":**

- Participated in: Climate Action Plan Advisory Task Force Working Group, The Georgia Tech Research Institute grant proposal process, interdisciplinary BBISS team for project design and implementation.

#### **"Natural and Health Shocks' impact on Children's Educational Outcomes":**

- Analyzed household data.

- Processed panel data using random, fixed effects and first differencing estimation.
- Evaluated logistic regression models (accuracy, confusion matrix, ROC Curve)

**“Poor agricultural households escaping poverty traps”:**

- Developed theoretical approach for the level of subsidy required to escape poverty.

**“Mekong River Basin and countries’ water security”:**

- Examined the dynamics of “hydro-politics” in both upstream and downstream locations.
- Researched on China’s disproportionate power advantage over downstream countries.

**Research Assistant**

Oct 2013 to Aug 2015

Aristotle University, School of Medicine, Medical Physics Laboratory

- Examined and Evaluated Data Mining Techniques (Random Forests, Random Trees, Support Vector Machines (SVMs) and Multilayer Perceptron (MLP) Networks) in the analysis of electroencephalographic (EEG) data to detect depressive patterns.
- Supported that synchronization of certain brain regions is more indicative of identifying depression symptoms.
- Generated time-series forecasting models of heart rate data.
- Computed intensity tolerable limit of physical exercise.
- Evaluated algorithms accuracy (such as Support Vector Regression, Gaussian Processes and Neural Networks)

**Senior Research Data Scientist**

Aug 2008 to Aug 2015

European Apiculture Programs Supervisor Institute of Plant Breeding and Genetic Resources (IPB & GR) of the Hellenic Agricultural Organization-Demeter (formerly NAGREF) supervised by the Ministry of Agriculture

- Analyzed and Evaluated Data Mining Techniques and Extracted Knowledge for Price and Subsidies Policy Determination.
- Analyzed of Honey Samples in the lab for pesticides residuals detection.

**Graduate Research Assistant**

Jan 2003 to Aug 2009

Aristotle University, School of Agriculture, Plant Pathology Laboratory

- Applied and Analyzed Data Mining Techniques and Evaluated Statistical Inference.
- Applied Principal Component Analysis (PCA), three-way and a two-way analysis of variance (ANOVA).

## CONFERENCES/PROGRAMS PRESENTATIONS

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**2023:** Southeastern Economic Association Conference (SEA), New Orleans, The South East Exchange of Development Studies (SEEDS), Georgia Institute of Technology,

**2022:** Rapid Fire Presentations on Global Development, 1st Brook Byers Institute for Sustainable Systems Scholar Symposium, Georgia Institute of Technology

**2022:** Southeastern Economic Association Conference (SEA), Fort Lauderdale, Ivan Allen College Graduate Student Conference, and Ivan Allen College Focus Scholars Program, Georgia Institute of Technology,

**2021:** Southeastern Economic Association Conference (SEA), Houston

## TEACHING EXPERIENCE

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**Instructor**, Georgia Institute of Technology, School of Economics

- ECON 2106: Principles of Microeconomics Aug 2023 to Dec 2023

**Graduate Teaching Assistant**, Georgia Institute of Technology, School of Economics

- ECON 2106: Principles of Microeconomics Aug 2020 to July 2021
- ECON 4180: Game Theory Economics Aug 2019 to Dec 2019
- ECON 4440: Economics of the Environment Jan 2020 to May 2020
- ECON 4340: Industrial Organization May 2021 to July 2021

**Teaching Fellow**, Stony Brook University, Dept. of Applied Mathematics and Statistics

- AMS 301: Finite Mathematical Structures Aug 2017 to Dec 2017
- AMS 332: Computational Modeling of Physiological Systems Jan 2018 to May 2018

**Graduate Teaching Assistant**, Aristotle University, School of Agriculture, Plant Pathology Laboratory

- N067Y: Pesticides (Laboratory) Sept 2006 to Dec 2007

## PREVIOUS EMPLOYMENT

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<b>Graduate Research Assistant</b> Brook Byers Institute of Sustainable Systems, Georgia Institute of Technology	Aug 2021 to July 2023
<b>Graduate Teaching Assistant</b> Georgia Institute of Technology, School of Economics	Aug 2019 to July 2021
<b>Graduate Fellow</b> Stony Brook University, Dept. of Applied Mathematics and Statistics	Aug 2017 to June 2018
<b>Senior Research &amp; Data Scientist</b> European Apiculture Programs Supervisor in Agricultural Beekeeping Cooperatives of Greece (Central Macedonia) Institute of Plant Breeding & Genetic Resources, Thessaloniki, Greece	Aug 2008 to Aug 2015
<b>Graduate Teaching Assistant</b> Aristotle University, Department of Agriculture	Sept 2006 to June 2008

## FELLOWSHIPS

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- Brook Byers Institute for Sustainable Systems (Graduate Research Fellow) Aug 2021 to July 2023
- Gerondelis Foundation (for Academic Excellence) Jan 2019 to Dec 2020

## MEMBERSHIPS

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- Southeastern Economic Association
- American Economic Association

## SKILLS

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- Python, C, C++, R, STATA, MATLAB, Weka, SQL, Tableau
- Tech to Teach Certificate (Georgia Institute of Technology)

## LANGUAGES

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English (Fluent), German (Fluent), Greek (Native)

## REFERENCES

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- Dr. Shatakshee Dhongde  
School of Economics  
Georgia Institute of Technology  
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- Dr. Casey Wichman  
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