
A.C. (Thanos) Bourtsalas, *Dipl.Eng., M.Sc., Ph.D.*

Lecturer in Energy and Materials, Earth and Environmental Engineering

Director, Earth Engineering Center

Co-Director, Plastics Pollution network, Climate School

Columbia University

Contact

Work address: 500 West 120th St., Mudd Engineering Building, #905D, NY 10027, U.S.A.**E-mail:** ab3129@columbia.edu**Phone:** +1 929 428 9737**Webpages:** <https://www.eee.columbia.edu/faculty/athanasios-bourtsalas><https://earth.engineering.columbia.edu/Research-Associates><https://wtert.org/our-members/>Google scholar: [Link](#) ; LinkedIn: [Link](#) .

Education

Aug 2018- Dec 2018 Harvard Business School, Credential of Readiness (CORe)

- Focused on Business Analytics, Economics, and Financial Accounting.

Oct 2011- Apr 2015 Imperial College London, London, UK: PhD in Civil & Environmental Engineering.

- Advisors: Profs. Chris Cheeseman (Prof. of Materials Resources Engineering), Sue Grimes (Prof. of Waste Management), and Luc Vandeperre (Prof. in Structural Ceramics).
- Thesis: Processing industrial residues into infrastructure materials with a focus on metals and minerals recovery.
- Research Focus: Specialization in sustainable civil engineering products derived from industrial residues. Expertise in integrating materials science with the recovery of metals and minerals, waste transformation, and energy. Strong emphasis on principles of circular economy and industrial symbiosis.
- Collaborations/Partnerships: Martin Gmbh, Veolia.

Sep 2008- May 2010 Columbia University, New York: MS in Earth & Environmental Engineering.

- Advisor: Prof. Vasilis Fthenakis (Director Center for Life Cycle Analysis).
- Thesis: LCA on materials used in PV Manufacturing.
- Full graduate scholarship.

Oct 2001- Oct 2006 University of Patras Greece: 5-year diploma, Electrical& Computer Engineering.

- Graduated top of class (1/120), 2006; Received Dean's honors and distinction.
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Professional appointments

Sep 2019- to date Lecturer in Energy and Materials, Earth and Environmental Engineering, Columbia University

- Focus: Specializing in sustainable development, life cycle and technoeconomic assessment, industrial ecology, waste management, and carbon capture.
- Achievements:
 - Developed and enhanced curriculum in industrial ecology, sustainable waste management, and carbon capture. Made significant contributions to the undergraduate teaching laboratory through innovative experiments and practices. Actively involved in guiding senior design projects and overseeing graduate research studies.
 - Consistently achieved high evaluation scores in over thirty courses taught, with an average above 4.5/5.0. Earned a nomination for the Presidential Teaching Award at Columbia University, reflecting a strong commitment to educational excellence.
 - Actively involved in academic governance, serving as the co-chair of the ABET committee, as well as the undergraduate and graduate committees, contributing to the continual improvement and accreditation of educational programs.

Oct 2019- to date Acting Director, Earth Engineering Center, Columbia University

- Focus: Leading initiatives in sustainable waste management and energy systems, with a strong emphasis on developing and optimizing environmentally sustainable processes.
- Achievements:
 - Initiated and strengthened significant research collaborations at national and international levels, significantly enhancing the Center's influence in the field of sustainable waste management and energy systems.
 - Played a key role in securing funding and resources for advanced research, with successful proposals to NSF, NOAA, and the US Department of Energy (US DoE).
 - Established and maintained productive collaborations with industrial partners, aligning research goals with industry needs and fostering practical applications of sustainable engineering solutions.

June 2022- to date Co-Director, Plastics Pollution Network, Climate School, Columbia University

- Focus: Research on global plastic pollution and developing resource recovery solutions.
- Achievements:
 - Successfully established a new interdisciplinary research network dedicated to tackling challenges in plastic pollution.
 - Co-led the development and submission of multi-million-dollar research proposals to the US Department of State (US DoS) and USAID-India, demonstrating effective collaboration with various schools and departments within Columbia University, as well as external national and international institutions.

Oct 2018- Aug 2019 Associate Research Scientist, Earth Engineering Center, Columbia University

- Focus: Development and optimization of sustainable waste management systems, with an emphasis on resource recovery.
- Achievements: Managed and led innovative research projects, fostered collaborations with international institutions such as Imperial College London, and contributed significantly to advancements in environmental engineering through cross-institutional initiatives.

Sep 2015- Oct 2018 Post-doctoral Research Scientist, Earth Engineering Center (EEC), Columbia University, New York

- Focus: Research in sustainable waste management systems, with a strong focus on resource recovery and environmental impacts.
- Achievements: Led a diverse team in pioneering research projects, including collaborative research with the Civil Engineering Department at Columbia and with Zhejiang University, (Hangzhou, China). Established partnerships with entities like Columbia Global Centers, Covanta Energy, and SACYR Group and made significant contributions to sustainable waste management and environmental engineering.

Sep 2015- May 2019 Adjunct Assistant Professor, Earth & Environmental Engineering, Columbia University

- Courses taught: Thermal Treatment of Waste and Biomass Materials (Graduate level), Industrial Ecology of Manufacturing Processes (Graduate level), Undergraduate Teaching Laboratory (ABET-accredited).
- Focus: Integrating practical industry insights into academic instruction, emphasizing sustainable practices in waste management and manufacturing processes.

Other professional activities

May 2017 to present United Nations Economic and Social Council: Advisor for the PPP Centre of Excellence.

- Key contributions include developing sustainable development guidelines for Public and Private Partnerships (PPPs) in relation to the SDGs, establishing key performance indicators, and conducting a stakeholder survey on the role of energy recovery from waste materials.

Sep 2015 to Sep 2021 Vice President, Global WTERT Council (wtert.org)

- Directed the Global Waste to Energy Research and Technology Council, coordinating activities of 20 sister organizations worldwide.
- Managed a team of research associates; represented the Council at international conferences, meetings, and events.
- Developed and conducted workshops and knowledge products to train experts from the waste management sector.

- Undertook pre-feasibility studies and developed investment strategies for waste management systems in Chile, Greece, and India.
- Conducted due diligence and valuation models for waste management projects, focusing on sustainability and technology implementation.
- Developed successful proposals for industrial partners, facilitating collaborative research and development projects.

May 2020 to Jan. 2021 United Nations Environmental Programme (UNEP): Advisor.

- Developed standards for alternative fuels in the energy sector for Lebanon, assessing energy mix and opportunities for decarbonization.

April 2018 to April 2020 International Finance Corporation (World Bank): Consultant.

- Provided strategic guidance on risk reduction in infrastructure investments, conducted cost forecasts for adopting EU Directives on resource and energy efficiency, and evaluated investment opportunities in over 10 companies.

Sep 2014 to Dec 2017 Ministry of Sustainability and Environment, Singapore: Member of the Technical Advisory Panel (team of five worldwide experts).

- Collaborated on legislative frameworks for sustainable utilization of urban and industrial residues, analyzed technology viability, and evaluated financial impact strategies.

Sep 2014 to Sep 2017 Cyclefi: Co-founder.

- Developed a software application for tracking and incentivizing recycling rates in municipalities in Greece.

Dec 2011 to Aug 2015 Waste to Energy Research and Technology Council-UK: Coordinator.

- Managed WTER-UK activities including organization of international seminars and collaborative events.

May 2010 to Oct 2011 Waste to Energy Research and Technology Council: Research Assistant.

- Conducted detailed research on waste management and energy production in Greece, and the U.K.

Academic awards and honours

2022	Nominated for the 2022 Presidential Awards for Outstanding Teaching
2022	Nominated for the Bodossakis Foundation Distinguished Young Scientists Award
2015	PhD early submission award, Imperial College London, UK
2014	CIWM Resource Efficiency Prize for best paper and oral presentation
2011- 2014	Dixon Presidential Scholarship, Imperial College London, UK
2008- 2010	Full graduate scholarship: Brookhaven National Laboratory, USA
2001-2006	Faculty of Engineering Dean's Honour List Every Single Academic Term

Peer-reviewed publications (Google scholar: Link [here](#); *: corresponding author)

1. [A.C. \(Thanos\) Bourtsalاس*](#), Energy recovery and GHG impact assessment of biomass, polymers, and coal. *Energy*, 2023; Volume 285, 129393, ISSN 0360-5442. <https://doi.org/10.1016/j.energy.2023.129393>.
2. [A.C. \(Thanos\) Bourtsalاس*](#), Impacts of China's import ban on US state-level paper waste exports, *Sustainable Production and Consumption*, 2023; ISSN 2352-5509, <https://doi.org/10.1016/j.spc.2023.11.017>.
3. [A.C.\(Thanos\) Bourtsalاس*](#), J. Wei, Exhaust steam utilization in waste-to-energy strategies: From district heating to desalination. *Journal of Cleaner Production*, 2023; Volume 428, 139389, ISSN 0959-6526, <https://doi.org/10.1016/j.jclepro.2023.139389>.
4. [A.C.\(Thanos\) Bourtsalاس*](#), I.M. Yepes, Y. Tian, U.S. plastic waste exports: A state-by-state analysis pre- and post-China import ban, *Journal of Environmental Management*, 2023, Volume 344, 118604, ISSN 0301-4797, <https://doi.org/10.1016/j.jenvman.2023.118604>.
5. J.M. Williams J.M, [A.C. \(Thanos\) Bourtsalاس*](#), Assessment of Co-Gasification Methods for Hydrogen Production from Biomass and Plastic Wastes. *Energies*, 2023; 16(22):7548. <https://doi.org/10.3390/en16227548>.
6. Y Tian, [A.C.\(Thanos\) Bourtsalاس*](#), S Kawashima, NJ Themelis, Using Waste-to-Energy Fine-Combined Ash as Sand or Cement Substitute in Cement Mortar. *Journal of Materials in Civil Engineering*, 2023; 35 (11), 04023378. <https://doi.org/10.1061/JMCEE7.MTENG-15684>.
7. Y. Tian, N. J. Themelis, [A.C.\(Thanos\) Bourtsalاس](#), S. Kawashima, Y. Gorokhovich, Systematic study of the formation and chemical/mineral composition of waste-to-energy (WTE) fly ash. *Materials Chemistry and Physics*, 2023; Volume 293, 126849, ISSN 0254-0584. <https://doi.org/10.1016/j.matchemphys.2022.126849>.
8. [A.C. \(Thanos\) Bourtsalاس*](#) Energy recovery from solid wastes in China and a Green-BRI mechanism for advancing sustainable waste management of the global South. *Waste Dispos. Sustain. Energy*, 2023; 5, 309–32. <https://doi.org/10.1007/s42768-022-00130-2>
9. [A.C. \(Thanos\) Bourtsalاس*](#), P.E. Papadatos, K. Kiskira, K. Kalkanis, C.S. Psomopoulos. Ecodesign for Industrial Furnaces and Ovens: A Review of the Current Environmental Legislation. *Sustainability*. 2023; 15(12):9436. <https://doi.org/10.3390/su15129436>
10. M. Wenchao, Cui J., Abdoulaye B., Wang Y., Du H., [A.C. \(Thanos\) Bourtsalاس*](#), and Chen G. Air Pollutant Emission Inventory of Waste-to-Energy Plants in China and Prediction by the Artificial Neural Network Approach. *Environ. Sci. Technol.* 2022; 57, 2, 874–883. <https://doi.org/10.1021/acs.est.2c01087>.

11. A.C. (Thanos) Bourtsalas*, N.J. Themelis. Materials and energy recovery at six European MBT plants. *Waste Management*, 2022; 141, 79-91. <https://doi.org/10.1016/j.wasman.2022.01.024> .
12. A.C. (Thanos) Bourtsalas*, T. Shen, Y. Tian, A Comprehensive Assessment of Products Management and Energy Recovery from Waste Products in the United States. *Energies*, 2022; 15 (18), 65-81. <https://doi.org/10.3390/en15186581> .
13. Y. Tian, N.J. Themelis, D. Zhao, A.C. (Thanos) Bourtsalas*, S. Kawashima. Stabilization of Waste-to-Energy (WTE) fly ash for disposal in landfills or use as cement substitute, *Waste Management*, 2022; 150, 227-243. <https://doi.org/10.1016/j.wasman.2022.06.043> .
14. Y. Tian, A.C. (Thanos) Bourtsalas*, S. Kawashima, X. Teng, N.J. Themelis. Performance of Waste-to-Energy fine combined ash/filter cake ash-metakaolin based artificial aggregate. *Construction and Building Materials*, 2022; 327, 127011. <https://doi.org/10.1016/j.conbuildmat.2022.127011> .
15. M. Wenchao, C. Ma, X. Liu, T. Gu, S. K. Thengane, A.C.(Thanos) Bourtsalas, G. Chen. NOx formation in fixed-bed biomass combustion: Chemistry and modelling. *Fuel*, 2021; Volume 290,119694, ISSN 0016-2361. <https://doi.org/10.1016/j.fuel.2020.119694> .
16. K. Sun, W. Wang, N.J. Themelis, A.C. (Thanos) Bourtsalas, Q. Huang. Catalytic co-pyrolysis of polycarbonate and polyethylene/polypropylene mixtures: Promotion of oil deoxygenation and aromatic hydrocarbon formation. *Fuel*, 2021; 285, 119143. <https://doi.org/10.1016/j.fuel.2020.119143> .
17. H. Zhang, N.J. Themelis, A.C. (Thanos) Bourtsalas. Environmental impact assessment of emissions from non-recycled plastic-to-energy processes. *Waste Disposal & Sustainable Energy*, 2021; 3. <https://doi.org/10.1007/s42768-020-00063-8> .
18. N.J. Themelis, A.C. (Thanos) Bourtsalas*. Methane Generation and Capture of US Landfills. *Journal of Environmental Science and Engineering A*, 2021. 199-206. doi:10.17265/2162-5298/2021.06.001.
19. A.C. (Thanos) Bourtsalas*, Q. Huang, H. Zhang, N.J. Themelis. Energy recovery in China from solid wastes by the moving grate and circulating fluidized bed technologies. *Waste Disposal & Sustainable Energy*, 2020; 2, 1, 27-36. <https://doi.org/10.1007/s42768-019-00026-8> .
20. L. Zhu, W. Zhao, Y. Yan, X. Liao, A.C. (Thanos) Bourtsalas, Y. Dan, H. Xiao, X. Chen. Interaction between mechanosensitive channels embedded in lipid membrane. *Journal of the Mechanical Behavior of Biomedical Materials*, 2020; 103, 103543. <https://doi.org/10.1016/j.jmbbm.2019.103543> .

21. K. Sun, N.J. Themelis, A.C. (Thanos) Bourtsalas, Q. Huang. Selective production of aromatics from waste plastic pyrolysis by using sewage sludge derived char catalyst, *Journal of Cleaner Production*, 2020; 268, 122038. <https://doi.org/10.1016/j.jclepro.2020.122038> .
22. Y. Tian, A.C. (Thanos) Bourtsalas*, S. Kawashima, M. Siwei, N.J. Themelis. Performance of structural concrete using Waste-to-Energy (WTE) combined ash. *Waste Management*, 2020. 118, 180-189. <https://doi.org/10.1016/j.wasman.2020.08.016> .
23. P. Lu, Q. Huang, A.C. (Thanos) Bourtsalas, Y. Chi, J. Yan. Effect of operating conditions on the coke formation and nickel catalyst performance during cracking of tar. *Waste and biomass valorization*, 2019; 10, 1, 155-165. <https://doi.org/10.1007/s12649-017-0044-5> .
24. P. Lu, Q. Huang, A.C. (Thanos) Bourtsalas, N.J. Themelis, Y. Chi, J. Yan. Review on fate of chlorine during thermal processing of solid wastes. *Journal of Environmental Sciences*, 2019; 78, 13-28. <https://doi.org/10.1016/j.jes.2018.09.003> .
25. W. Wang, N.J. Themelis, K. Sun, A.C. (Thanos) Bourtsalas, Q. Huang, Y. Zhang, Z. Wu. Current influence of China's ban on plastic waste imports. *Waste Disposal & Sustainable Energy*, 2019; 1, 1, 67-78. <https://doi.org/10.1007/s42768-019-00005-z> .
26. A.C. (Thanos) Bourtsalas*, N.J. Themelis. Major sources of mercury emissions to the atmosphere: The US case. *Waste Management*, 2019; 85, 90-94. <https://doi.org/10.1016/j.wasman.2018.12.008> .
27. A.C. (Thanos) Bourtsalas*, Y. Seo, T. Alam, Md Tanvir, Y.-C. Seo. The status of waste management and waste to energy for district heating in South Korea. *Waste Management*, 2019; 85, 304-316. <https://doi.org/10.1016/j.wasman.2019.01.001> .
28. A.C. (Thanos) Bourtsalas*, J. Zhang, M.J. Castaldi, N.J. Themelis, A.N. Karaiskakis. Use of non-recycled plastics and paper as alternative fuel in cement production. *Journal of cleaner production*, 2018; 181. <https://doi.org/10.1016/j.jclepro.2018.01.214> .
29. E. Kyriakis, C. Psomopoulos, P. Kokkotis, A.C. (Thanos) Bourtsalas, N.J. Themelis. A step-by-step selection method for the location and the size of a waste-to-energy facility targeting the maximum output energy and minimization of gate fee. *Environmental Science and Pollution Research*, 2018; 25, 27, 26715-26724. <https://doi.org/10.1007/s11356-017-9488-1> .
30. P. Lu, Q. Huang, A.C. (Thanos) Bourtsalas, Y. Chi, J. Yan. Synergistic effects on char and oil produced by the co-pyrolysis of pine wood, polyethylene, and polyvinyl chloride. *Fuel*, 2018; 230, 359-367. <https://doi.org/10.1016/j.fuel.2018.05.072> .
31. P. Lu, Q. Huang, A.C. (Thanos) Bourtsalas, Y. Chi, J. Yan. Experimental research of basic properties and reactivity of waste derived chars. *Applied Thermal Engineering*, 2017; 119, 639-649. <https://doi.org/10.1016/j.applthermaleng.2017.03.099> .

32. B. Hu, Q. Huang, A.C. (Thanos) Bourtsalas, M. Ali, Y. Chi, J. Yan. Effect of chlorine on the structure and reactivity of char derived from solid waste. *Energy & Fuels*, 2017; 31, 7, 7606-7616. <https://doi.org/10.1021/acs.energyfuels.7b01042> .
33. A.C. (Thanos) Bourtsalas*, R. Detsch, A. Boccaccini, C. Cheeseman. Initial studies on the cytotoxicity of ceramics prepared from dry discharge incinerator bottom ash dust. *Ceramics International*, 2016; 42, 15, 17924-17927. <https://doi.org/10.1016/j.ceramint.2016.07.107> .
34. A. Vardelle, C. Moreau, J. Akedo, H. Ashrafizadeh, C. Berndt, J. Berghaus, M. Boulos, J. Brogan, A.C. (Thanos) Bourtsalas, A. Dolatabadi. The 2016 thermal spray roadmap. *Journal of thermal spray technology*, 2016; 25, 8, 1376-1440. <https://doi.org/10.1007/s11666-016-0473-x> .
35. A.C. (Thanos) Bourtsalas*, L.J. Vandeperre, S.M. Grimes, N.J. Themelis, C.R. Cheeseman. Production of pyroxene ceramics from the fine fraction of incinerator bottom ash. *Waste Management*, 2015; 45, 217-225. <https://doi.org/10.1016/j.wasman.2015.02.016> .
36. A.C. (Thanos) Bourtsalas*, L. Vandeperre, S. Grimes, N.J. Themelis, R. Koralewska, C.R. Cheeseman. Properties of ceramics prepared using dry discharged waste to energy bottom ash dust. *Waste Management & Research*, 2015; 33, 9, 794-804. <https://doi.org/10.1177/0734242X15584846> .

Peer-Reviewed Journal Papers submitted

37. A.C. (Thanos) Bourtsalas*. Statewide analysis of U.S. Metal Waste and Industrial Residues Trade Dynamics from 2002 to 2022. *Nature Communications*, October 2023, under review, available at Research Square [<https://doi.org/10.21203/rs.3.rs-3443899/v1>]

Editorials

1. N.J. Themelis, A.C. (Thanos) Bourtsalas*, Recovery of Materials and Energy from Urban Wastes, A Volume in the Encyclopedia of Sustainability Science and Technology, Second Edition, Springer, 2019. [Link](#)

Policy reports

1. A.C. (Thanos) Bourtsalas*, T. Bonnici, C. Malafosse. Guidelines on Public and Private Partnerships for the Sustainable Development Goals: Pathways towards a Circular Economy. United Nations, Committee on Innovation, Competitiveness, and Public and Private Partnerships, December 2022. Available here: https://unece.org/sites/default/files/2020-12/ECE_CECI_WP_PPP_2020_05-en.pdf .
2. R. Annepu, A.C.(Thanos) Bourtsalas*, R. Intharathirat, S. Charoenkit. Chapter 15: Urban Waste. Assessment Report on Climate Change and Cities. Prepared for the UN Paris Agreement, on behalf of Earth Institute, Columbia University, New York, USA, May 2015.

Book chapters

1. J. Vehlow, A.C. (Thanos) Bourtsalas* WTE: Management of WTE Residues in Europe R. A. Meyers (ed.), Encyclopedia of Sustainability Science and Technology. Recovery of Materials and Energy from Urban Wastes, 2019; Pages 159-181, Springer. https://doi.org/10.1007/978-1-4939-2493-6_866-3.
2. A.C. (Thanos) Bourtsalas*. WTE: Non-recycled Combustible Wastes in Cement Production. R. A. Meyers (ed.), Encyclopedia of Sustainability Science and Technology. Recovery of Materials and Energy from Urban Wastes, 2019; Pages 141-157, Springer. https://doi.org/10.1007/978-1-4939-2493-6_1046-1.
3. A.C. (Thanos) Bourtsalas*, K. Aravossis. ‘Worldwide Waste to Energy business models: technical, environmental and financial considerations’, Developments in biotechnology and bioengineering: waste treatment processes for energy generation’, Eds: A. Padney, R. Kumar, S. Kumar, Springer, 2018.
4. E. Kalogirou, A. C. (Thanos) Bourtsalas, M. Klados, N.J. Themelis. ‘Waste management in Greece and potential for Waste-to-Energy’, Waste-to-Energy: Opportunities and Challenges for Developing and Transition Economies, Springer, 2012. p.219-235. https://doi.org/10.1007/978-1-4471-2306-4_9.

Articles in newspapers

1. Kathimerini Newspaper Contributions (January 2017 - September 2017): Authored three featured articles for Kathimerini, one of Greece's leading newspapers, with a focus on sustainable waste management. These articles, highlighted on the front cover of the Sunday issue, aimed to educate stakeholders about sustainable waste practices and explore potential solutions for Greek society.

Invited Speaker Engagements

- **Keynote and Invited Speaker:** Delivered keynote speeches and presentations at international conferences and seminars on themes associated with sustainable waste management, circular economy, energy recovery, and waste-to-energy technologies. Notable engagements include United Nations conferences and events at Columbia Global Centers.
- **Guest Lecturer:** At Northwestern University, Xi’an, China (Summer 2019), and Universidad del Desarrollo, Santiago, Chile (Summer 2017), delivered lectures and courses on environmental assessment, systems analysis, waste management, and energy systems. Contributed to curriculum development and seminar organization, and provided mentorship to undergraduate students, focusing on sustainable development and life cycle techno-economic assessments. Guest lecturers in universities in China, Chile, Colombia, Greece, India, and Indonesia.

Research support

Principal Investigator:

1. A.C. (Thanos) Bourtsalas (PI), N.J. Themelis (co-PI), S. Kawashima (co-PI). “Recovery of metals and production of civil engineering products from WTE residues” Covanta Energy Industrial Collaboration. Award Amount: \$87,000 Duration: 01/2018-01/2022.

Co-Principal Investigator:

2. N. Nagaraj (PI), A.C.(Thanos) Bourtsalas (co-PI). ‘Fluorine management and reduction in copper concentrates.’ Rio Tinto Industrial Collaboration. Award Amount: \$272,000. Duration: 12/2021-present
3. N. Nagaraj (PI), R. Farinato (co-PI), A.C.(Thanos) Bourtsalas (co-PI). ‘Improving metals recovery in mining operations.’ Anglo American Industrial Collaboration. Award Amount: \$193,000. Duration: 09/2021-present
4. B. Yan (PI), J. Goes (co-PI), A.C. (Thanos) Bourtsalas (co-PI). Developing sustainable and closed-loop solutions to reduce synthetic fibers, microplastics, and nanoplastics leakage from laundry systems into the marine environment. NOAA. Award amount: \$1,428,452. Duration: 04/2023-03/2026.
5. A. Park (PI), A. Moment (co-PI), R. Farinato (co-PI), X. Su (co-PI), N. Nagaraj (co-PI), A. C. (Thanos) Bourtsalas (co-PI). Innovative Stirred Media Mill Reactor for Combined Reactive Comminution and Mineral Dissolution Integrated with Electrochemical Separation of Metals and PGMs and Carbon Mineralization. ARPA-E Miner. Award Amount: \$3,688,207. Duration: 04/2023-01/2026.
6. S. Kawashima (PI), A.C. (Thanos) Bourtsalas (co-PI), A. Moment (co-PI), S. Kelly (co-PI). Bio-inspired calcium carbonate composites as sustainable cement-free binders for construction. NSF. Award amount: \$345,111. Duration: 06/2023- 05/2025.
7. N.J. Themelis (PI), A.C. (Thanos) Bourtsalas (co-PI). ‘Research in sustainable waste management’. Covanta Energy Industrial Collaboration. Award Amount: \$200,000. Duration: 09/2015-12/2019.
8. N.J. Themelis (PI), A.C.(Thanos) Bourtsalas (co-PI). ‘Development of framework for integrated waste management in Central and Latin America’. Presidential Innovation Grant for Columbia Global Centers. Award Amount: \$372,000. Duration: 01/2016-12/2018.
9. C. Cheeseman (PI), A.C. (Thanos) Bourtsalas (co-PI). ‘Recovery of metals from WtE residues.’ Martin Gmbh Industrial Collaboration. Award amount: \$70,000. Duration:06/2014-12/2015.

Membership in Professional Societies

- Registered (Licensed/Chartered) Professional Electrical Engineer in Europe (116007).
- Member of the International Society for Industrial Ecology.
- Member of the International Solid Waste Association (ISWA: 11-1589).
- American Society for Mechanical Engineers (ASME: 100779364).

Committees and Service

Conference committees:

Organizer for Global WTERT bi-annual meeting, 2017 and 2019.

Co-Organizer for International Conference on Sustainable Waste Management, 2019-present.

Co-Organizer for International Solid Waste Association, World Congress, 2016-2019.

Session Chair for Recycling and Circular Economy, International Solid Waste Association, World Congress, 2018 and 2019.

Review Panels:

2021 Virtual panel for REMADE, DoE.

2021 Virtual panel for NSF SBIR.

2021 Virtual review panel for NSF CBET Environmental Engineering.

2020 Virtual review panel for NSF SBIR.

Journals reviewer:

Fuel Processing Technology, Energy and Fuels, Waste Management, Journal of Cleaner Production, Journal of Environmental Management, Journal of Industrial Ecology, Waste Management & Research, Energy Conversion and Management, Sustainable Production and Consumption, Energy, Waste and Biomass Valorization.

Internal Service:**Dept. of Earth and Environmental Engineering**

Co-Chair ABET Committee 2019–Present

Graduate Program

Co-Chair Graduate admissions committee 2019-Present

Graduate Advising Committee 2019-Present

Qualifying Exam Committee 2019–Present

Undergraduate Program

Undergraduate Lab Development Committee 2019–Present

Undergraduate Advising Committee 2019–Present

Undergraduate Program/Curriculum 2021-Present

Teaching at Columbia University

1. E4302 Carbon Capture, 3 credits. Fall 2020: 32 students; Fall 2021: 26 students; Fall 2022: 35 students.
2. E4210 Thermal Treatment of Waste and Biomass Materials, 3 credits. Fall 2016: 14 students; Fall 2017: 17 students; Fall 2018: 15 students.
3. E4200 Global Engineering Track, 3 credits. Fall 2021: 56 students; Fall 2022: 68 students.
4. E4160 Solid and Hazardous Waste Management, 3 credits. Spring 2020: 36 students; Spring 2021: 68 students; Spring 2022: 82 students; Fall 2023: 75 students.
5. E2100/4100 A Better Planet by Design, 3 credits. Fall 2019: 57 students; Fall 2020: 72 students; Fall 2021: 81 students; Fall 2022: 122 students; Fall 2023: 130 students.
6. E4001 Industrial Ecology, 3 credits. Spring 2017: 42 students; Spring 2018: 38 students; Spring 2019: 49 students; Spring 2020: 54 students; Spring 2021: 48 students; Spring 2022: 57 students.
7. E3800 Earth and environmental engineering laboratory (Developed a 200-page laboratory manual), 6 credits. Spring-Fall 2019: 14 students; Spring-Fall 2020: 18 students; Spring-Fall 2021: 12 students; Spring-Fall 2022: 19 students. Spring-Fall 2023: 12 students.
8. E1102 Art of Engineering, 1 credit. Fall 2020: 18 students; Fall 2021: 22 students; Fall 2022: 25 students; Fall 2023: 21 students.

Mentoring

Supervision of Graduate Students:

- Supervised over 20 graduate students (MS, PhD, and postdoctoral researchers) in sustainable waste management, energy systems, resource recovery, and sustainability assessments.
- Key projects included conducting sustainability impact studies of energy and waste management systems, assessing resource recovery from industrial residues, and enhancing metal recovery in mining operations.
- Played an advisory role in the MS program, providing academic and research guidance to graduate students.
- Facilitated collaborative projects with institutions such as Columbia University, Imperial College London, and the City College of New York.

Supervision of Undergraduate Students:

- Mentored over 10 undergraduate students in projects focusing on industrial residue characterization and processing, life cycle analysis, and sustainable waste management strategies.
- Collaborated with Lamont-Doherty Earth Observatory and the Civil Engineering Department at Columbia University.
- Actively contributed to senior design projects, providing technical guidance and support to help students apply theoretical knowledge to real-world engineering problems.

Skills and Abilities

Software: Environmental (Simapro, OpenLCA, Gabi, LeachXS), Process Simulation (Aspen).

Programming & Data Analysis: C++, Java, Python, R, Matlab, SPSS, Excel, Originlab, MySQL.

Mapping & Geospatial Analysis: Arc-GIS.

Design of experiments: JMP, Stat-ease.

Flow Analysis: STAN, Ansys.

Languages: Greek (native), English (professional proficiency), German (basic/intermediate proficiency).

Public Engagement and Volunteer Contributions

1. **Co-Founder, Materials in Renewable Energy Systems (RES) Committee, ASME (2022-present):** Developed and currently co-leading a new committee dedicated to establishing industry standards for repurposing materials in renewable energy technologies. This initiative falls under the purview of ASME's Clean Energy Technology Group Committee, aiming to foster sustainable practices in energy technology.
2. **Faculty Advisor, Engineers Without Borders (2020-present):** Mentored undergraduate students in developing and implementing sustainable infrastructure projects in Kenya.
3. **Vice Chair, Materials and Energy Division, American Society for Mechanical Engineers (MER-ASME) (2018-present):** Advanced through various positions to currently serve as Vice Chair. Focuses on leading initiatives and formulating strategies in sustainable materials and energy practices.
4. **Member, Working Group on Energy Recovery, International Solid Waste Association (ISWA) (2016-present):** Contributed to global strategies in waste-to-energy recovery.
5. **Invited Contributor to United Nations Economic and Social Council (2016-present):** Actively participated in pro-bono discussions and working groups focusing on integrating circular economy principles into the Sustainable Development Goals.
6. **Organizer, EEE Student-Faculty Lunches (2021, 2022, 2023):** Facilitated dialogues and collaborations between students and faculty.
7. **Instructor, SHAPE Program for High School Students (Summer 2022, 2023):** Conducted six-week classes focusing on sustainability concepts.
8. **Participant, Modernization of Undergraduate Education Program, College of Engineering, Ramaiah University (Summer 2018):** Engaged in contemporary educational practices.