

Carlo Alberto Amadei

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EDUCATION

Harvard University Ph.D. Environmental Engineering (3.9/4.0)	Cambridge (US), Exp. 2019
Autonomous University of Barcelona, M.Sc. Materials Science and Nanotechnology (9.0/10.0)	Barcelona (SP), 2014
University of Modena & Reggio Emilia, M.Eng. Environmental Engineering (110/110 cum laude)	Modena (IT), 2012
University of Modena & Reggio Emilia, B.Eng. Environmental Engineering (110/110 cum laude)	Modena (IT), 2009

RESEARCH EXPERIENCE

I am interested in the intersection between nanotechnology and environmental engineering. In particular, I research how we should implement nanomaterials to enhance performances of environmental applications (e.g. water treatment) in a safe manner.

Harvard University , Graduate Researcher	Cambridge (US), 2014 - Present
<ul style="list-style-type: none">• Managed research projects to fabricate novel membranes incorporating nanomaterials• Evaluated toxicity of carbon materials based on their nanoproperties• Developed and implemented high-throughput standardization methods for characterizing nanomaterials• Computational fluid dynamics simulation of water transport inside nanomaterials	
Masdar Institute of Science and Technology , Research Assistant	Abu Dhabi (UAE), 2012 - 2014
<ul style="list-style-type: none">• Tested, and analyzed nanomaterials for sustainable energy applications• Developed characterization techniques based on atomic force microscopy	
Beijing Univeristy of Technology , Master student	Beijing (China), 2011 - 2012
<ul style="list-style-type: none">• Analyzed concentrating solar power application for Chinese energy landscape	

TEACHING and MENTORING EXPERIENCE

Harvard University , Teaching Fellow	Cambridge (US), 2015 - 2017
<ul style="list-style-type: none">• Assisted in teaching three undergraduate classes in environmental engineering (water engineering)	
Harvard University , Mentor	Cambridge (US), 2015 - 2018
<ul style="list-style-type: none">• Mentor five undergraduate students (Rawan Almallahi, Michael Wong, Daniel Chang, Leticia Ortega, Cailey Martin, Jazmin Simpkins) in their semester-long research class in environmental engineering• Mentor one master student (Julian Kadow) during his thesis in membranes fabrication	

PUBLICATIONS

- 15) **C.A. Amadei**, P. Arribas, C. Vecitis Graphene oxide standardization and classification: Methods to support the leap from lab to industry. *Carbon*, 133, 398-409 (2018).
- 14) **C.A. Amadei**, Montessori A., J. Kadow ,S. Succi , C. Vecitis. Role of Oxygen Functionalities in Graphene Oxide Architectural Laminate Subnanometer Spacing and Water Transport. *Environmental Science and Technology*, 51 (8), pp 42804288 (2017).
- 13) A. Montessori, **C.A. Amadei**, G. Falcucci, M. Sega, C. Vecitis, S. Succi. Extended friction elucidates the breakdown of fast water transport in graphene oxide membrane. *Europhysics Letters*, 116, 54002 (2016).
- 12) **C.A. Amadei** and C. Vecitis. How to Increase the Signal-to-Noise Ratio of Graphene Oxide Membrane Research. *Journal of Physical Chemistry Letters*, 7, (19) 3791-379 (2016).
- 11) S. Santos, C. Y.Lai, **C.A. Amadei**, K. Gadelrab, T. C. Tang; A. Verdaguer, V. Barcons, J. Font, J. Colchero, M. Chiesa, The Mendeleev-Meyer Force Project. *Nanoscale*, 8, 17400-17406 (2016).
- 10) **C.A. Amadei**, Y. Stein, G. Silverberg, B. Wardle, C. Vecitis. Fabrication and morphology tuning of graphene oxide nanoscrolls. *Nanoscale*, 8, 6783-6791 (2016).
- 9) **C.A. Amadei**, C.Y. Lai., M. Esplandiu, F. Alzina, C. Vecitis, A. Verdaguer., M. Chiesa. Elucidation of the wettability of graphene through a multi-length-scale investigation approach. *RSC Advances*, 5 (49), 39532 (2015).
- 8) C.Y. Lai, T. C. Tang, **C. A. Amadei**, A. Marsden, A. Verdaguer, N. Wilson, M. Chiesa. A nanoscopic approach to studying evolution in graphene wettability. *Carbon*, 80, 784-792 (2014).
- 7) **C.A. Amadei**, C.Y. Lai, D. Heskes, M. Chiesa. Time dependent wettability of graphite upon ambient exposure: The role of water adsorption. *The Journal of Chemical Physics*, 141 (8), 084709 (2014).

- 6) **C.A. Amadei**, R. Yang, M. Chiesa, K. Gleason, S. Santos. Revealing Amphiphilic Nanodomains of Anti-Biofouling Polymer Coatings. *Applied Materials and Interfaces*, 6 (7), 4705-4712 (2014).
- 5) T.C. Tang, **C.A. Amadei**, N.H. Thomson, M. Chiesa. Ion Exchange and DNA Molecular Dip Sticks: Studying the Nanoscale Surface Wetting of Muscovite Mica. *The Journal of Physical Chemistry C*, 118 (9), 4695-4701 (2014).
- 4) **C.A. Amadei**, S. Santos, S. Pehkonen, A. Verdaguer, M. Chiesa. Minimal Invasiveness and Spectroscopy-Like Footprints for the Characterization of Heterogeneous Nanoscale Wetting in Ambient Conditions. *The Journal of Physical Chemistry C*, 117 (40), 2081920825 (2013).
- 3) **C.A. Amadei**, T.C. Tang, M. Chiesa, S. Santos. The aging of a surface and the evolution of conservative and dissipative nanoscale interactions. *The Journal of Chemical Physics*, 139 (8), 084708, (2013).
- 2) S. Santos, **C.A. Amadei**, A. Verdaguer, M. Chiesa, Size Dependent Transitions in Nanoscale Dissipation. *The Journal of Physical Chemistry C*, 117 (20), 10615-10622 (2013).
- 1) **C. A. Amadei**, G. Allesina, P. Tartarini, W. Yuting. Simulation of GEMASOLAR-based solar tower plants for the Chinese energy market: Influence of plant downsizing and location change. *Renewable Energy*, 55 (0), 366-373 (2013).

In preparation:

- Fully Carbon Membranes: an Hegelian approach in the membrane field.
- A Quantitative Assay Reveals Size and Oxidation Level Impact Toxicity of Graphene Oxide (GO).

PRESENTATIONS

- 10) **C.A. Amadei**. Graphene Oxide membranes for water treatment applications. Poster Presentation at American Membrane Technology Association conference (Long Beach, CA. February 14, 2017)
- 9) **C.A. Amadei**. Graphene Oxide Membranes. Oral Presentation at MRS Fall Meeting 2015 (Boston, MA. November 30, 2016)
- 8) **C.A. Amadei**. Role of Oxygen Functionalities in Graphene Oxide Architectural Laminate. Oral Presentation at New England Graduate Water Symposium (Amherst College. September 11, 2016)
- 7) **C.A. Amadei**, M. Baraldi. Education and Technology: Innovative Levers Between Business and Environment. Oral Presentation at Center for business ethics5 (Bentley University. July 25, 2016)
- 6) **C.A. Amadei**, C. Vecitis. Water flow in graphene oxide nanochannels. Poster Communication at Graphene Week 2016 (Warsaw, Poland. June 17, 2016)
- 5) **C.A. Amadei**, M. Chiesa. Amphiphilic Polymer Nanodomains for Anti-Fouling Coatings. Oral Presentation at MRS Fall Meeting 2015 (Boston. November 30, 2015)
- 4) **C.A. Amadei**, S. Santos, M. Chiesa. AM-AFM Force Spectroscopy: a Framework to Evaluate the Time Dependent Wettability of Graphitic Surfaces. Oral presentation at 5th Multifrequency AFM Conference (Madrid, Spain. June 16, 2014)
- 3) **C.A. Amadei**, M. Chiesa. Footprint of Adsorbed Water Layers in Nanoscale Force Profile under Ambient Conditions. Poster Communication at MRS Fall Meeting 2013 (Boston, MA. December 3, 2013)
- 2) **C.A. Amadei**, M.Chiesa. Detection of Water Under Ambient Conditions with Nanoscale Spatial Resolution. Oral Presentation at UK Scanning Probe Microscopy (Leeds, UK. June 27, 2013)
- 1) **C.A. Amadei**. Force Profiles in Atomic Force Microscope. Poster Communication at AFM workshop (Abu Dhabi, UAE. May 21, 2013)

FELLOWSHIPS and AWARDS

USBR-AMTA , Fellowship	2018-2019
AMTA , Affordable Desalination Collaboration Fellowship (awarded to 3 students nationwide)	2017
Pierce Fellow (additional scholarship at Harvard University)	2014 - 2017
Premio Mussini for academic excellence (University of Modena, awarded to 5 graduate students)	2012
First Place in Engineering Program for International Students (Beijing University of Technology)	2011
Premio di Studio for academic excellence during undergraduate degree (University of Modena)	2009

GRANTS PREPARATION

- **U.S.-EGYPT Joint board on scientific and technological cooperation, \$393,000** Collaborated in a team of four to write the proposal ("Development of high fouling resistance carbon nanocomposite membrane with novel FO/RO integrated systems")
- **Carbon mineralization strategy, \$148,000.** Collaborated in a team of three to write the proposal ("Electrochemical filtration treatment of trace elements recovery from waste water for climate change"). The grant funded my last two years of research (2017-2019)
- **Bureau of Reclamation collaboration.** Established collaboration with the BOR to have a large scale filtration setup lent to our laboratory

INDUSTRY and ENTREPRENEURSHIP

Novartis, Environmental Defense Fund Fellow

Cambridge (US), Summer 2018

- Modeled carbon dioxide emissions in the supply chain to drive sustainable business (15%/year reduction in total emissions)

Aqua Novus, Co-Founder

Cambridge (US), spring-summer 2017

- Start-up for sensing contaminants using engineered bacteria. This innovation fills the technology gap in the detection of heavy metals by offering cost-effective (100x cheaper) engineering solutions
- Developed market opportunity, competitive analysis, and business plan, and pitched in front of investors
- Finalist MIT Water Prize, semi-finalist MIT 100k, Harvard Incubation Program, 2nd round MassChallenge

SKILLS and INTERESTS

Computer: Python, Matlab, Adobe Illustrator Image J, L^AT_EX, SAM (System Advisor Model for Solar Tech)

Languages: Italian (mother tongue), English (fluent)

Technical: Engineering of water filtration systems; experience in bottom-up and top-down fabrication; expert user of materials characterization tools

Interests: Triathlon (Ironman finisher), travel (45 countries), mountaineering, sustainable business (worked in collaboration with Harvard Business School researchers on sustainable use of resources)