

# Brian F. Naess

## Education/Training

- M.S. Environmental Management and Policy, University of North Carolina at Chapel Hill. 2001.  
B.A. Geology, University of Colorado at Boulder. 1998.

## Professional Experience

### 2013-present Institute for the Environment, UNC-Chapel Hill, Chapel Hill, NC; GIS Analyst and Lecturer.

- GIS Analyst
  - Developed datasets and methodology to analyze health benefits associated with electrification of medium- and heavy-duty trucks in New York City and Atlanta (EDF funded contract)
  - Developed datasets and methodology for Zip code Air Pollution Policy Assessment (ZAPPA) tool for New York City at the zip code level and the state of New York at the county level (NYSERDA funded contract)
  - Developed emissions processor to convert FAA's AEDT data into AERMOD-ready and ADM-ready inputs
  - Developed methodology and datasets for intersection-level air quality modeling based on sub-second trajectory data (FHWA funded contract)
    - Created a series of Python scripts to produce publication-quality charts for evaluating model results
  - Contributed to the development of web-based, community-level screening tools for assessing near-road air quality called C-TOOLS (EPA funded contract)
    - Prepared spatial data for all tools, including polylines representing roads, rail lines, shipping channels, and airport taxiways, runways, and flight paths; polygons representing rail yards and port terminals; and points representing hoteling emissions
    - Helped conceptualize and design the user interface
  - Assembled a spatial inventory of potential idling locations for trucks (EPA funded contract)
  - Refined a spatial inventory of commercial marine vessels in the Great Lakes region (Lake Michigan Air Directors Consortium (LADCO) funded contract)
- Co-Manager, The EcoStudio (Spring 2018 – present)
  - Founded and co-manage program for undergraduate students that pairs them with sustainability-related internships and independent research projects
  - Meet weekly with students to ensure a positive experience
  - Developed a curriculum focused on professional development (ENEC 393/493)
- Lecturer (see Teaching Experience section below for course listing/description)
- Lead Web Programmer
  - Design, program, maintain, and update Institute-sponsored web sites using ColdFusion, Python, Postgres/Oracle databases, HTML5, CSS, Javascript, Bootstrap, etc.
  - Design, program, maintain, and update all web sites related to the CMAS Center (EPA funded contract) including [www.cmascenter.org](http://www.cmascenter.org).
  - Design and program a web site to facilitate collaboration between scientists in the Research Triangle who are working on climate-related research (EPA funded contract)
- Information Technology Manager
  - Serve as the Institute's Information Security Liason (ISL) and update all IE faculty and staff with the latest security updates/requirements from UNC ITS
  - Provide guidance on any of the Institute's technology-related purchases or decisions
  - Maintain computing equipment used for CMAS-related air quality training

- Conference Management
  - Two annual conferences: CMAS Conference (2013-present) and NC Clean Tech Summit (2014-2016)
    - Maintain and update CMAS conference web site and Clean Tech Summit web site
    - Monitor registrations and facilitate communication between registrants and conference organizers
    - Coordinate conference planning and activities to ensure efficiency
- Capstone Coordinator (July 2017 – December 2019)
  - Coordinate and organize 3-7 different ENEC698 Environmental Capstone sections during spring and fall semesters
    - Distribute available funding for course-related expenses
    - Coordinate with campus and community partners to match potential projects/clients with instructors
    - Plan for final presentation of all capstone sections

### **2001-2013 Institute for the Environment, UNC-Chapel Hill, Chapel Hill, NC; Research Associate**

- GIS Analyst
  - Developed road network datasets and near-road receptor networks as model input for air quality modeling work in Detroit (EPA funded contract)
  - Developed an ArcGIS-based tool for calculating near-road pollution concentrations (EPA funded contract)
  - Researched potential scenarios related to the expansion of the Panama Canal and prepared detailed GIS data sets for five main seaports on the East/Gulf coasts (EPA funded contract)
  - Developed input data for air quality modeling work related to US Class I areas (EPA funded contract)
  - Created polygon-based input data for air quality modeling of areas around natural gas drilling locations in the western US (State/Private funded contract)
- Lecturer (see Teaching Experience section below for course listing/description)
- Lead Web Programmer
- CMAS Conference Management
- Assistant to the Director, Albemarle Ecological Field Site (2001 – 2003)
  - Assisted the field site director with the planning, logistics, and operation of a field station for undergraduate study on the Outer Banks of North Carolina (now called the Outer Banks Field Site) during the fall months

### **Teaching Experience**

ENEC 259. Coral Reef Ecology and Management (Spring semesters, 2002 – present) – Co-teach an introductory coral reef ecology and management course. Duties also include planning and coordinating a trip for 20-50 people over spring break to the US Virgin Islands or San Salvador, Bahamas and managing and editing a comprehensive online resource about coral reefs (coraldigest.org) with student-contributed content.

ENEC 393/493. Environmental Internship (Spring 2018 – present) – Teach and mentor undergraduate students who are either working at internships or working on independent research projects for a variety of different clients on- and off-campus. Weekly meetings focus on assisting the students with their projects and building their professional skills.

ENEC 698. Environmental Capstone (Fall 2019) - Led a semester-long group project for UNC Energy Services investigating how much money UNC can save if every building on campus met its target energy use intensity (EUI).

ENEC 698. Environmental Capstone (Spring 2019) - Led a semester-long group project using the EnviroAtlas to identify underserved communities in the Triangle for the EPA. The team put together a series of Story Maps to explain their methodology and demonstrate how the analysis was used in Carrboro.

ENEC 698. Environmental Capstone (Fall 2018) - Led a semester-long group project collecting and analyzing air quality data around campus to prioritize potential mitigation strategies for UNC professor Will Vizuete.

ENEC 698. Environmental Capstone (Spring 2018) - Led a semester-long group project building on the previous semester's work on smart cities in the Triangle region to develop an interactive Smart Cities Asset Map for the Research Triangle Cleantech Cluster (RTCC).

ENEC 698. Environmental Capstone (Fall 2017) - Led a semester-long group project collecting and analyzing metrics related to smart cities in the Triangle region for the Research Triangle Cleantech Cluster (RTCC).

ENEC 698. Environmental Capstone (Fall 2016) – Led a semester-long group project assessing ways the Town of Chapel Hill can reduce air quality impacts in the Franklin Street business district from transportation-related sources.

ENEC 395. Independent Research in Ecuador (Spring 2016) – Served as faculty of record for nine undergraduate students conducting independent research projects in various locations in Ecuador, including the Galapagos, the Paramo, and a biological station in the Ecuadorian Amazon rainforest.

ENEC 698. Environmental Capstone (Fall 2015) – Led a semester-long group project looking at ways to address and mitigate the food desert in the Southeast Community of Newport News, Virginia. Client: Greater Southeast Development Corporation.

Independent Study (Spring 2015) – Mentored a senior SILS student while she worked on a semester-long project to improve a set of scripts used to combine disparate air quality model outputs

Independent Study (Spring 2015) – Mentored a senior environmental science student while she completed a semester-long research project on incorporating edible/medicinal plants into the landscaping on campus at UNC

ENEC 698. Environmental Capstone (Spring 2015) – Led a semester-long group project looking at the health impacts related to the movement of freight and several community-identified stressors in the Southeast Community of Newport News, Virginia. Client: EPA.

ENEC 698. Environmental Capstone (Fall 2014) – Led a semester-long group project focused on building a web-based decision support tool to increase the availability and consumption of local fruit and vegetables. Client: Ecoland Institute.

ENEC 490H. The Future of Energy (Spring 2015, Spring 2014) – Assisted with the development and instruction for a new course about clean technology and the future of energy. (Unlisted co-instructor)

## Skills/Interests

- GIS – QGIS, PostGIS, ArcGIS (Desktop and Online)

- Programming – Python, CSS, ColdFusion, Javascript, Git, PHP
- Databases – Postgres, Oracle, MySQL

## Selected Publications/Presentations

- Shukla, Komal; Seppanen, Catherine; Naess, Brian; Chang, Charles; Cooley, David; Maier, Andreas; Divita, Frank; Pitiranggon, Masha; Johnson, Sarah; Ito, Kazuhiko; Arunachalam, Saravanan. ZIP code-level estimation of air quality and health risk due to particulate matter pollution in New York City, *Environmental Science & Technology*, 2021. In review.
- Valencia, Alejandro; Arunachalam, Saravanan; Isakov, Vlad; Naess, Brian; Serre, Marc. Improving emissions inputs via mobile measurements to estimate fine-scale Black Carbon monthly concentrations through geostatistical space-time data fusion, *Science of The Total Environment*, Volume 793, 2021, ISSN 0048-9697. <https://doi.org/10.1016/j.scitotenv.2021.148378>.
- Sorte, Sandra; Arunachalam, Saravanan; Naess, Brian; Seppanen, Catherine; Rodrigues, Vera; Valencia, Alejandro; Borrego, Carlos; Monteiro, Alexandra. Assessment of source contribution to air quality in an urban area close to a harbor: Case-study in Porto, Portugal, *Science of The Total Environment*, Volume 662, 2019, Pages 347-360. ISSN 0048-9697. <https://doi.org/10.1016/j.scitotenv.2019.01.185>.
- Isakov, V.; Arunachalam, S.; Baldauf, R.; Breen, M.; Deshmukh, P.; Hawkins, A.; Kimbrough, S.; Krabbe, S.; Naess, B.; Serre, M.; Valencia, A. Combining Dispersion Modeling and Monitoring Data for Community-Scale Air Quality Characterization. *Atmosphere* 2019, 10, 610.
- Arunachalam, Saravanan; Naess, Brian; Seppanen, Catherine; Valencia, Alejandro; Brandmeyer, JoEllen; Venkatram, Akula; Weil, Jeff; Isakov, Vlad; Barzyk, Timothy. 2019. A new bottom-up emissions estimation approach in support of air quality modeling for community-scale assessments around airports. *International Journal of Environment and Pollution*, Vol. 65, No. 1/2/3, 2019. DOI: [10.1504/IJEP.2019.101832](https://doi.org/10.1504/IJEP.2019.101832)
- Naess, Brian. *A Deeper Appreciation of Coral Reefs Through Snorkeling: How to Become a Pro Snorkeler*. Kindle ed., Snorkel Pro Books, 2018. ASIN: B07B9N7LFQ. ISBN: 978-0-692-08703-9.
- Isakov, Vlad; Barzyk, Timothy; Smith, Elizabeth; Arunachalam, Saravanan; Naess, Brian; Venkatram, Akula. A web-based screening tool for near-port air quality assessments, In *Environmental Modelling & Software*, Volume 98, 2017, Pages 21-34, ISSN 1364-8152, <https://doi.org/10.1016/j.envsoft.2017.09.004>
- Arunachalam, S., Brantley, H., Barzyk, T.M., Hagler, G., Isakov, V., Kimbrough, E.S., Naess, B., Rice, N., Snyder, M.G., Talgo, K. and Venkatram, A., 2015. Assessment of port-related air quality impacts: geographic analysis of population. *International Journal of Environment and Pollution*, 58(4), pp.231-250.

- Barzyk, T.M., Isakov, V., Arunachalam, S., Venkatram, A., Cook, R. and Naess, B., 2015. A near-road modeling system for community-scale assessments of traffic-related air pollution in the United States. *Environmental Modelling & Software*, 66, pp.46-56.
- Chang, S.Y., Vizuete, W., Valencia, A., Naess, B., Isakov, V., Palma, T., Breen, M. and Arunachalam, S., 2015. A modeling framework for characterizing near-road air pollutant concentration at community scales. *Science of the Total Environment*, 538, pp.905-921.
- Brantley, H.L., Hagler, G.S., Kimbrough, S., Isakov, V., Barzyk, T.M., Arunachalam, S. and Naess, B., 2015. 108th Air and Waste Management Association Annual Conference and Exhibition, ACE 2015- Connecting the Dots: Environmental Quality to Climate. In *Air and Waste Management Association*.
- Snyder, M., Arunachalam, S., Isakov, V., Talgo, K., Naess, B., Valencia, A., Omary, M., Davis, N., Cook, R. and Hanna, A., 2014. Creating locally-resolved mobile-source emissions inputs for air quality modeling in support of an exposure study in Detroit, Michigan, USA. *International journal of environmental research and public health*, 11(12), pp.12739-12766.
- Arunachalam, S., Barzyk, T., Isakov, V., Venkatram, A., Snyder, M., Rice, N.A., Naess, B. and Talgo, K., 2014. HARMO 2014-16th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes, Proceedings. In *Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*.

## Technical Reports

- Naess, Brian; Seppanen, Catherine; Arunachalam, Saravanan; Dowling, Richard G.; Wu, Zifeng; Fordham, Damon; Roupail, Nagui M.; Zamurs, John. October, 2020. *Evaluation of Methods for Modeling Vehicle Activity at Signalized Intersections for Air Quality Hot-Spot Analyses, Final Report*. FHWA-HEP-21-008. Contract or Grant No. DTFH6117D00007L, order no. 693JJ318F000339.  
[https://www.fhwa.dot.gov/environment/air\\_quality/conformity/research/eval\\_methods/](https://www.fhwa.dot.gov/environment/air_quality/conformity/research/eval_methods/)