Daniel Andrade Schuch

Address: 211 Princeton St – 02128, Boston-MA, US
Contact number: +1 (875) 269-8017
e-mail: d.schuch@northeastern.edu and underschuch@gmail.com

Abstract

Meteorologist, with a specialization in micrometeorology, and a PhD in science, I bring extensive expertise in numerical weather and air quality models and the development of computational tools. My professional interests include atmospheric boundary layer, turbulence, transport phenomena, wind tunnel essays, atmospheric chemistry and analytical solutions. My work is focused on advancing our understanding of the atmosphere through innovative scientific research.

Address to the Scientific platform Lattes: http://lattes.cnpq.br/7656605773440811

Experience

POST DOCTORAL | NORTHEASTERN UNIVERSITY | 2020-ACTUAL

· Application, evaluation and development of Air Quality models in multiple projects and regions including:

-Brazil: Multiyear application and evaluation of WRF-Chem model, including model development, development of emission and emission projection for different scenarios for 2050.

-US: Development of GHG emissions (for WRF-GHG and WRF-Chem-GHG) and model evaluation.

-Dubai: Application of CAMx model and use of probing tools for source apportionment, process analysis and simulation of emission scenarios.

POST DOCTORAL | SÃO PAULO UNIVERSITY | 2018-2019

· Study of the impact on air quality of emission scenarios in the formation of the secondary pollutants: ozone (O_3) and particulate matter (pm 2.5μ) in Brazilian metropolitan regions using numerical models.

POST DOCTORAL | SÃO PAULO UNIVERSITY | 2017-2018

· Application of the WRF-Chem model to evaluate and study the air quality in urban areas and adjacent regions and the development of atmospheric emission inventories and Open-Source tools to the creation of emissions for air quality models.

EXPERT CONSULTANT | ENEVA S.A. | SET - OUT 2016

· Simulations of the dispersion of sulfur dioxide (SO_2) from the thermoelectric plant at Itaqui Port located in São Luís Maranhão-Brazil and analysis of the results. The analysis was delivered in the form of media (images and animation) and a technical report together with the technical opinion.

TECHNOLOGICAL DEVELOPMENT RESEARCHER | NATIONAL INSTITUTE FOR SPACE RESEARCH | 2011 - 2013

· Research activities with data extracted from wind tunnel essays and experiments with a LES model (Large Eddy Simulation) to determine the behaviour of turbulent flow in regions with gaps on the Amazon forest and mechanisms of atmospheric interaction between clearings and forest.

Academic formation

- **POST-DOC | 2020 | NORTHEASTERN UNIVERSITY**
- **POST-DOC | 2019 | SÃO PAULO UNIVERSITY**
- **POST-DOC | 2018 | SÃO PAULO UNIVERSITY**
- **PHD IN SCIENCE | 2017 | AERONAUTICS INSTITUTE OF TECHNOLOGY**
- **MASTER IN METEOROLOGY | 2011 | FEDERAL UNIVERSITY OF PELOTAS**
- **BACHELOR IN METEOROLOGY | 2009 | FEDERAL UNIVERSITY OF PELOTAS**

Complete articles published in periodicals

20. SEULKEE HEO, DANIEL SCHUCH; WASHINGTON LEITE JUNGER; YANG ZHANG; MARIA DE FATIMA ANDRADE; MICHELLE L. BELL. The impact of exposure assessment on associations between air pollution and cardiovascular mortality risks in the city of Rio de Janeiro, Brazil. Submitted to Environmental Research, 2024.

19. PACHON, J. E., OPAZO, M., LICHTIG, P., HUNNEUS, N., BOUARAR, I., BRASSEUR, G., LI, C. W. Y., FLEMMING, J., MENUT, L., MENARES, C., GALLARDO, L., GAUSS, M., SOFIEV, M., KOUZNETSOV, R., PALAMARCHUK, J., DAWIDOWSKI, L., ROJAS, N. Y., ANDRADE, M. D. F., GAVIDIA-CALDERÓN, M. E., DELGADO PERALTA, A. H., AND SCHUCH, D.: Air quality modeling intercomparison and multi-scale ensemble chain for Latin America, EGUsphere, https://doi.org/10.5194/egusphere-2024-815, 2024.

18. GAVIDIA-CALDERÓN, MARIO; **SCHUCH, DANIEL**; VARA-VELA, ANGEL; INOUE, RITA; FREITAS, EDMILSON D.; ALBUQUERQUE, TACIANA TOLEDO DE A.; ZHANG, YANG; ANDRADE, MARIA DE FATIMA; BELL, MICHELLE L. Air quality modeling in the metropolitan area of São Paulo, Brazil: A review. *ATMOSPHERIC ENVIRONMENT*, v.319, p.120301, 2024. http://doi.org/10.1016/j.atmosenv.2023.120301

17. LYU, XIAOPU; LI, KE; GUO, HAI; MORAWSKA, LIDIA; ZHOU, BEINING; ZEREN, YANGZONG; JIANG, FEI; CHEN, CHANGHONG; GOLDSTEIN, ALLEN H.; XU, XIAOBIN; WANG, TAO; LU, XIAO; ZHU, TONG; QUEROL, XAVIER; CHATANI, SATORU; LATIF, MOHD TALIB; **SCHUCH, DANIEL**; SINHA, VINAYAK; KUMAR, PRASHANT; MULLINS, BENJAMIN; SEGUEL, RODRIGO; SHAO, MIN; XUE, LIKUN; WANG, NAN; CHEN, JIANMIN; GAO, JIAN; CHAI, FAHE; SIMPSON, ISOBEL; SINHA, BAERBEL; BLAKE, DONALD R. A synergistic ozone-climate control to address emerging ozone pollution challenges. *One Earth*, v.6, p.964 - 977, 2023. http://doi.org/10.1016/j.oneear.2023.07.004

16. PENDHARKAR, JAYANT; FIGUEROA, SILVIO NILO; VARA-VELA, ANGEL; KRISHNA, R. PHANI MURALI; **SCHUCH, DANIEL**; KUBOTA, PAULO YOSHIO; ALVIM, DÉBORA SOUZA; VENDRASCO, EDER PAULO; GOMES, HELBER BARROS; NOBRE, PAULO; HERDIES, DIRCEU LUÍS. Towards Unified Online-Coupled Aerosol Parameterization for the Brazilian Global Atmospheric Model (BAM): Aerosol-Cloud Microphysical-Radiation Interactions. *Remote Sensing*, v.15, p.278 - , 2023. http://doi.org/doi:10.3390/rs15010278

15. MEDEIROS, LUIZ E.; FISCH, G.; ACEVEDO, OTÁVIO C.; COSTA, FELIPE D.; IRIART, PAULO G.; ANABOR, VAGNER; **SCHUCH, Daniel**. Low-Level Atmospheric Flow at the Central North Coast of Brazil. *BOUNDARY-LAYER METEOROLOGY*, v.179, p.1 - 15, 2021. http://doi.org/10.1007/s10546-021-00625-1

14. **SCHUCH, DANIEL**; ANDRADE, MARIA DE FATIMA; ZHANG, YANG; DIAS DE FREITAS, EDMILSON; BELL, MICHELLE L. Short-Term Responses of Air Quality to Changes in Emissions under the Representative Concentration Pathway 4.5 Scenario over Brazil. *Atmosphere*, v.11, p.799, 2020. https://doi.org/10.3390/atmos11080799

13. **DANIEL SCHUCH**; Sergio Ibarra Espinosa; Leila Droprinchinski Martins; Vanessa Silveira Barreto Carvalho; Bruna Ferreira Ramin; Jayne Souza Silva; Jorge Alberto Martins; Edmilson Dias de Freitas and Maria de Fatima Andrade. A two decades study on ozone variability and trend over the main urban areas of the São Paulo state – Brazil. *Environmental Science and Pollution Research* (2019). https://doi.org/10.1007/s11356-019-06200-z

12. **SCHUCH, DANIEL,** DIAS DE FREITAS, EDMILSON, IBARRA-ESPINOSA ANDRADE, M. F. EmissV: A preprocessor for WRF-Chem model. Journal of Atmospheric Science Research. v.1, p.1 - 5, 2019.

11. IBARRA-ESPINOSA, SERGIO; **SCHUCH, DANIEL**; DIAS DE FREITAS, EDMILSON eixport: An R package to export emissions to atmospheric models. Journal of Open Source Software, v.3, p.607 - 1, 2018.

10. **SCHUCH, DANIEL**; IBARRA-ESPINOSA, SERGIO; DIAS DE FREITAS, EDMILSON EmissV: An R package to create

vehicular and other emissions for air quality models. Journal of Open Source Software, v.3, p.662 - 6, 2018.

9. LEITE, HENRIQUE FANINI; AVELAR, ANA CRISTINA; DE ABREU, LEANDRA; **SCHUCH, DANIEL**; CAVALIERI, ANDRÉ Proper Orthogonal Decomposition and Spectral Analysis of a Wall-Mounted Square Cylinder Wake. JOURNAL OF AEROSPACE TECHNOLOGY AND MANAGEMENT (ONLINE), v.10, p.1 - 1, 2018.

8. **SCHUCH, Daniel**; FISCH, G. Rocket emissions representation in atmospheric air quality models: The short-range atmospheric transport and reaction of gases released by solid propellant engines. Meteorological Applications, v.25, p.1 - 10, 2018.

7. CORRÊA, CLEBER SOUZA; **SCHUCH, DANIEL**; DE QUEIROZ, ANTONIO PAULO; FISCH, GILBERTO FERNANDO; CORRÊA, FELIPE DO NASCIMENTO; COUTINHO, MARIANE MENDES The Long-Range Memory and the Fractal Dimension: A Case Study for Alcântara. JOURNAL OF AEROSPACE TECHNOLOGY AND MANAGEMENT (ONLINE), v.9, p.461 - 468, 2017.

6. **SCHUCH, DANIEL**; FISCH, GILBERTO. The Use of an Atmospheric Model to Simulate the Rocket Exhaust Effluents Transport and Dispersion for the Centro de Lançamento de Alcântara. JOURNAL OF AEROSPACE TECHNOLOGY AND MANAGEMENT (ONLINE), v.9, p.137 - 146, 2017.

5. MEDEIROS, LUIZ E.; FISCH, G.; IRIART, P.; COSTA, F. D.; OLIVEIRA, D. W.; **SCHUCH, Daniel**. Padrões de vento a nível de superfície para região da costa norte do Brasil (*Surface-level wind patterns for the northern Brazilian coast region*). CIÊNCIA E NATURA. v.38, p.383 - 387, 2016.

4. **SCHUCH, DANIEL**; MARCIOTTO, EDSON R.; ACEVEDO, OTÁVIO; FISCH, GILBERTO; AVELAR, ANA CRISTINA. Estudo do escoamento turbulento atmosférico utilizando ensaios em túnel de vento e simulação numérica (*Study of atmospheric turbulent flow using wind tunnel and numerical simulation*). Revista Brasileira de Meteorologia, v.29, p.338 - 350, 2014.

3. DEMARCO, G.; PUHALES, F. S.; COSTA, F. D.; **SCHUCH, Daniel**; FARIA, A. F.; AVELAR, A. C.; FISCH, G.; ACEVEDO, O. Análize da influência da estratificação sobre perfis de vento e temperatura em experimentos de túnel de vento (*Analysis of the influence of stratification on wind profiles and temperature in wind tunnel experiments*). Ciência e Natura, v.Esp, p.172 - 174, 2013.

2. **SCHUCH, Daniel**; MARCIOTTO, E. R.; FISCH, G.; AVELAR, A. C. Perfils de vento e turulência atmosférica simulados em túnel de vento (*Wind profiles and atmospheric turbulence simulated in wind tunnel*). Ciência e Natura, v.Esp, p.159 - 161, 2013.

1. **SCHUCH, Daniel**; WEYMAR, Guilherme J.; FURTADO, Igor C.; QUADROS, R. S.; BUSKE, D. Simulação da dispersão de poluentes na camada limite atmosférica incluindo o efeito da deposição seca no solo (*Simulation of dispersion of pollutants in the atmospheric boundary layer including the effect of dry deposition on soil*). Ciência e Natura. v.33, p.127 - 130, 2011.

Articles in publishing process

1. **Daniel Schuch**, Yang Zhang, Maria de Fatima Andrade, Sergio Ibarra-Espinosa, Mario Eduardo Gavidia Calderón, Mariana Império, Roberto Schaeffer and Michelle L. Bell. Multi-Year Application and Evaluation of the WRF-Chem Model for Two Major Urban Areas in Brazil: Part 1 Initial Application and Model Improvement.

2. **Daniel Schuch**, Yang Zhang, Maria de Fatima Andrade, Sergio Ibarra-Espinosa, Mario Eduardo Gavidia Calderón, Mariana Império, Roberto Schaeffer and Michelle L. Bell. Multi-Year Application and Evaluation of the WRF-Chem Model for Two Major Urban Areas in Brazil: Part 2 Multi-Year Evaluation and Urban-centric Analysis.

3. **Daniel Schuch**, Yang Zhang, Kiarash Farzad. Application of WRF-CAMx over Southwest Asia: Model Evaluation and Process Analysis.