

# Sergio Alejandro Ibarra Espinosa

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## Objective

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To develop a career in emissions inventories, air pollution, climate research and data science.

## Education

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### Post-Doc in of Atmospheric Sciences, Universidade de São Paulo (USP) 01/11/2017 – present

- Evaluate the impacts of different science-policy actions of vehicles on air quality in Brazil using VEIN and WRF-Chem.
- Develop open-source software to generate emissions inventories, process and air quality inputs.
- Create YouTube Channel to teach VEIN and EIXPORT.

### Post-Doc in of Atmospheric Sciences, Chinese Academy of Sciences 01/01/2019 – 15/07/2020

- Developing comprehensive vehicle emissions inventories for China.

### PhD in Atmospheric Sciences, Universidade de São Paulo (USP) 01/09/2013 – 30/10/2017

- PhD thesis: Air pollution modeling in São Paulo using bottom-up vehicular emissions inventories <https://teses.usp.br/teses/disponiveis/14/14133/tde-29052018-140319/en.php>.
- Developed the R package VEIN (Vehicular Emissions Inventories) <https://CRAN.R-project.org/package=vein>. VEIN is now used in many countries more than 20000 direct downloads <https://github.com/atmoschem/vein> with Fortran and OpenMP.
- Developed the R package EIXPORT <https://CRAN.R-project.org/package=eixport>, with more than 17000 direct downloads <https://github.com/atmoschem/eixports>.
- Won the Chilean Government's "Becas Chile" Scholarship
- Generated emission inputs and run WRF Chem model.
- Mentored by air pollution and meteorology expert Prof. Rita Ynoue and co-mentored by Prof. María de Fátima Andrade (Universidade de São Paulo), Prof. Edzer Pebesma (University of Munster) and Prof. Mauricio Osses (Universidad Santa Maria).
- Internship TRL Transport Research Lab UK as emissions analyst.
- Course: Numerical Modeling of the Atmosphere: GCM Design and Applications by Carlos Mechoso (UCLA) at IAG/USP.
- Organized internal and external meetings, workshops, and seminars at University of São Paulo.

01/09/2010 – 10/06/2011

### Masters in Environmental Planning and Management from the Universidad de Chile, Santiago

- Won the Chilean Government's "Centro Nacional del Medio Ambiente" Scholarship.
- While working as a Emissions Inventories research analyst, graduated with a Masters from the University of Chile
- Master thesis: Identification of Improvements into estimation of vehicular emissions in Santiago, Chile. <http://mgpa.forestaluchile.cl/Tesis/Ibarra%20Sergio.pdf>

15/09/2003 – 22/06/2007

### Bachelor in Environmental Science from Universidad Tecnológica Metropolitana, Santiago, Chile

- Majored in Environmental Engineering and Risk Prevention
- Bachelor thesis: "Effects of air pollution on Acute Respiratory Infections of the Emergency Care Service (SAPU) Pudahuel" La Estrella "(2007).
- Diploma in English (2006-2007) and Diploma in Leadership (2006-2007)

## Experience

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### Centro Nacional del Medio Ambiente, Santiago, Chile 01/09/2007 – 30/08/2013

- Worked for five years conducting emissions inventory projects and writing technical reports for Ministry of Environment and Ministry of Energy.
- Estimated emissions at airports in Chile using Emissions Dispersion Modeling Software EDMS.
- Assessed and evaluated European Emission Inventories (CLRTAP), United States (NEI), Australia (NPI), and Japan (JPRTR). Completed literature reviews on international GHG policies and road models (e.g. COPERT, HBEFA)

- Completed GHG emissions inventory projects for the Ministry of Energy, Chile, RM 2010, the Andacollo Municipality 2011, and the Ministry of Environment, Chile, RM 2010.

## Skills & Computational Language

- R (advanced), Fortran (medium), Python (basic), Bash (basic), Latex (medium), Markdown (advanced).
- WRF-Chem, QGIS, VEIN, EIXPORT. Autor of 10 R packages.
- Several basic and advanced R and Python courses on Datacamp. Currently enrolled in Data Scientist with Python and Data Scientist with R.

## Languages

Portuguese (fluent); English (advanced); Spanish (fluent). Lived 8 years in Brazil and completed all PhD courses/exams through Portuguese. Advanced English course at the University of Alabama, Tuscaloosa, USA (2007). TOEIC (2007): Oral comprehension 445. Written comprehension 305. TOEFL (2015): Results: 553 in (2007) and 580

## Manuscripts under review and preprints

1. **Ibarra-Espinosa, S.A.**, Freitas, E.D., Ropkins K., Dominici F., Rehbein, A. (2021). Association between COVID-19, mobility and environment in São Paulo, Brazil. Medrxiv (doi: <https://doi.org/10.1101/2021.02.08.21250113>).
2. Gavidia-Calderón, M. E., **Ibarra-Espinosa, S.**, Kim, Y., Zhang, Y., and Andrade, M. D. F.: Simulation of O<sub>3</sub> and NO<sub>x</sub> in Sao Paulo street urban canyons with VEIN (v0.2.2) and MUNICH (v1.0). (2020). Geosci. Model Dev. Discuss. [preprint], <https://doi.org/10.5194/gmd-2020-282>, in review, 2020.
3. Freitas, E.D., **Ibarra-Espinosa, S.A.**, Gavidia-Calderón, M.E., Rehbein, A., Abou Rafee, S.A., Martins, J.A., Martins, L.D., Santos, U.P., Ning, M.F., Andrade, M.F., Trindade, R.I.F. (2020). Mobility Restrictions and Air Quality under COVID-19 Pandemic in São Paulo, Brazil. Preprints 2020, 2020040515 (doi: 10.20944/preprints202004.0515.v1).
4. **Ibarra-Espinosa S**, Freitas ED., Martins L. Vehicular emissions in Brazil between 1960 and 2060. Paper in preparation for Earth System Science Data (IF 9.1) Special issue | Surface emissions for atmospheric chemistry and air quality modelling.
5. **Ibarra-Espinosa S**, Freitas ED. Comprehensive vehicular emissions for Latin America COVELA (1.0). Paper in preparation for Earth System Science Data (IF 9.1) Special issue | Surface emissions for atmospheric chemistry and air quality modelling.

## Publications with peer review process

1. **Ibarra-Espinosa, S.**, Zhang, X., Xiu, A., Gao, C., Wang, S., Ba, Q., Gao C. and Chen, W. (2021). A comprehensive spatial and temporal vehicular emissions for northeast China. Atmospheric Environment, 244, 117952.
2. Bolaño-Ortiz, T. R., Camargo-Caicedo, Y., Puliafito, S. E., Ruggeri, M. F., Bolaño-Díaz, S., Pascual-Flores, R., Saturno J., **Ibarra-Espinosa S.**, Mayol-Bracero O., Torres-Delgado E. and Cereceda-Balic, F. (2020). Spread of SARS-CoV-2 through Latin America and the Caribbean region: a look from its economic conditions, climate and air pollution indicators. Environmental research, 191, 109938.
3. Pinto, J. A., Kumar, P., Alonso, M. F., Andreão, W. L., Pedruzzi, R., **Ibarra-Espinosa, S.**, Maciel F. and de Almeida Albuquerque, T. T. (2020). Coupled models using radar network database to assess vehicular emissions in current and future scenarios. Science of The Total Environment, 143207.
4. Freitas, E.D., M.F. Andrade, **Ibarra-Espinosa, S.A.**, Gavidia-Calderón. (2020). Redução nas concentrações de poluentes durante o surto de COVID-19 na Cidade de São Paulo. Diálogos socioambientais na macrometrópole paulista. URL <https://periodicos.ufabc.edu.br/index.php/dialogossocioambientais/issue/view/20>. ISSN 2596-2183
5. **Ibarra-Espinosa, S.**, Ynoue, R. Y., Ropkins, K., Zhang, X., & de Freitas, E. D. (2020). High spatial and temporal resolution vehicular emissions in south-east Brazil with traffic data from real-time GPS and travel demand models. Atmospheric Environment, 222, 117136.
6. **Ibarra-Espinosa, S.**, Ynoue, R., Giannotti, M., Ropkins, K., & de Freitas, E. D. (2019). Generating traffic flow and speed regional model data using internet GPS vehicle records. MethodsX, 6, 2065-2075.
7. Pinto, J. A., Kumar, P., Alonso, M. F., Andreão, W. L., Pedruzzi, R., **Espinosa, S. I.**, & de Almeida Albuquerque, T. T. (2020). Kriging method application and traffic behavior profiles from local radar network database: A proposal to support traffic solutions and air pollution control strategies. Sustainable Cities and Society, 102062.
8. Ma S, Zhang X, Gao C, Tong DQ, Xiu A, Wu G, Cao X, Huang L, Zhao H, Zhang S, **Ibarra-Espinosa S**, Wang X, Li X, Mo D. Multimodel simulations of a springtime dust storm over northeastern china: Implications of an evaluation of four commonly used air quality models (CMAQ v5.2.1, CAMx v6.50, CHIMERE v2017r4, and WRF-chem v3.9.1). Geoscientific Model Development 2019,12(11):4603-25.
9. Rehbein, A, Ambrizzi, T, Mechoso, CR, **Espinosa, SAI**, Myers, TA. Mesoscale convective systems over the Amazon basin: The GoAmazon2014/5 program. Int J Climatol. 2019, 1– 20. <https://doi.org/10.1002/joc.6173>.
10. Schuch, D., de Freitas, E. D., **Espinosa, S. I.**, Martins, L. D., Carvalho, V. S. B., Ramin, B. F., ... & de Fatima Andrade, M. (2019). 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, 26(31), 31699-31716.
11. Chiquetto, J. B., Ynoue, R. Y., **Ibarra-Espinosa, S. A.**, Ribeiro, F. N. D., Cabral-Miranda, W., & Silva, M. E. S. (2020). Ozone Pollution and Urban Mobility Scenarios in the São Paulo Megacity. *Ambiente & Sociedade*, 23.
  12. Chiquetto, J.B., Silva, M.E.S., Cabral-Miranda, W., Ribeiro, F.N.D., **Ibarra-Espinosa, S.A.**, Ynoue, R.Y. Air Quality Standards and Extreme Ozone Events in the São Paulo Megacity. *Sustainability* 2019, 11, 3725.
  13. **Ibarra-Espinosa, S.**, Ynoue, R., O'Sullivan, S., Pebesma, E., Andrade, M. D. F., and Osses, M.: VEIN v0.2.2: an R package for bottom-up vehicular emissions inventories, *Geosci. Model Dev.*, 11, 2209-2229, <https://doi.org/10.5194/gmd-11-2209-2018>, 2018.
  14. **Ibarra-Espinosa S.**, Schuch D., Dias de Freitas E. (2018). eixport: An R package to export emissions to atmospheric models. *Journal of Open Source Software*, 3(24), 607, <https://doi.org/10.21105/joss.00607>
  15. Schuch D. **Ibarra-Espinosa S.**, Dias de Freitas E. (2018). EmissV: an R package to create vehicular and other emissions for air quality models. *Journal of Open Source Software*, 3(30), 662, <https://doi.org/10.21105/joss.00662>
  16. Schuch, D., **Ibarra-Espinosa, S.**, de Freitas, E. D., and de Fatima Andrade, M. (2018a). Emissv: a preprocessor for wrf-chem model. *Journal of Atmospheric Science Research*, 1(2):35–45.
  17. **Ibarra S.**, Ynoue R. (2017). REMI model: Bottom - up emissions inventories for cities with lack of data. *Journal of earth sciences and geotechnical engineering*.
  18. Andrade MF., Ynoue R., Freitas E., Todezco E., Vara-Vela A., **Ibarra S.** Martins L., Martins J and Carvalho V. (2015). Air quality forecasting system for southeastern Brazil. *Frontiers in Environmental Science*.
  19. Santibañez D., **Ibarra S.**, Matus P., Seguel R. y Leiva M. (2011). Particulate matter (PM<sub>2.5</sub>) and cerebrovascular diseases in Santiago de Chile. *Environmental Pollution*.
  20. Abrutzky R., **Ibarra S.**, Matus P., Romero-Lankao P., Pereyra V. (2013). Atmospheric pollution and mortality. A comparative study between two Latin American cities: Buenos aires (Argentina) and Santiago (Chile). *International journal of environment and Health*.

## Conferences

1. **Ibarra-Espinosa S**, Freitas ED. (2020). Increment of O<sub>3</sub> During Lockdown Related To Spatial-Temporal Variability Of VOC/NO<sub>2</sub> Emissions-Ratio In São Paulo, Brazil. Conference: AGU Fall meeting 2020At: Online.
2. **Ibarra-Espinosa S**, Freitas ED. The VEIN model to compile multiscale vehicular emissions inventories. Conference: 19 GEIA Conference - The Global Emissions Initiative and Accelerating Social Transformations. Santiago, Chile.
3. **Ibarra-Espinosa S**, Martins L. Vehicular emissions in Brazil between 2007 and 2017. CMAS Conference, Minas Gerais, Brasil, July 2019.
4. Ynoue R., **Ibarra-Espinosa S**. Modeling vehicular emissions at São Paulo. CMAS Conference, Minas Gerais, Brasil, July 2019.
5. **Ibarra-Espinosa S**, Zhang X, Aijun X, Dias de Freitas E. High spatial resolution vehicular emissions inventory for China using VEIN model. Japan Geoscience Union (JPGU) meeting, Chiba, Japan from May 26 th to 30 th , 2019.
6. Chiquetto .J, Ynoue R., **Ibarra S.**, Riberiro F., Cabral-Miranda W., Siqueira Silva M. 2018. "Driving Restriction Policies in São Paulo Simulation and Impacts on Ozone Air Quality in its Metropolitan Area." In 2018 1o ANPPAS Sudeste - Sustentabilidade e InterdisciplinaridadeAt: EACH/USP, São PauloVolume: ISBN 9788564842458
7. **Ibarra-Espinosa, Sergio**, Edmilson Dias de Freitas. 2018. "Parallelizing the Vehicular Emissions Inventory model (VEIN) with Foreach Parallel Adaptor doMC." In 2018 I GPU computing workshop, Instituto de Física, São Paulo, Brazil.
8. **Ibarra-Espinosa, Sergio**, Edmilson Freitas, Rita Ynoue, Maria de Fátima Andrade, and Daniel Schuch. 2018. "Towards a Vectorial Global Vehicular Emissions Inventory." In 2018 Joint 14th iCACGP Quadrennial Symposium/15th Igac Science Conference, Takamatsu, Japan.
9. **Ibarra-Espinosa, Sergio**. (2018). O programa VEIN: mapeamento de emissões veiculares em condições de trafego urbano real. IV Simpósio de Eficiência Energética: Emissões e Combustíveis. Associação Brasileira de Engenharia Automotiva. São Paulo | Brazil| 14 June 2018.
10. **Sergio Ibarra**, Rita Ynoue, Mariana Giannotti, Maria de Fatima Andrade, Edmilson Freitas, and Daniel Schuch. (2018). Using Internet GPS traffic data for vehicular emissions inventories and air pollution modeling. European Geosciences Union General Assembly Vienna | Austria | 8–13 April 2018.
11. **Sergio Ibarra**, Rita Ynoue, María de Fátima Andrade, and Edmilson Freitas. (2018). Recent development and perspectives of the VEIN model. European Geosciences Union General Assembly 2018 Vienna | Austria | 8–13 April 2018.
12. **Sergio Ibarra-Espinosa**, Daniel Schuch, Rita Ynoue, and Edmilson Freitas,. (2018). VEIN, EmissV and eixport R packages for multiscale emissions inventories. European Geosciences Union General Assembly 2018 Vienna | Austria | 8–13 April 2018.
13. Chiquetto J., Ynoue R., **Ibarra-Espinosa S.**, Ribeiro F.N.D., Cabral-Miranda W., Silva M. (2018). Driving Restriction Policies in São Paulo Simulation and Impacts on Ozone Air Quality in its Metropolitan Area. 1o ANPPAS Sudeste - Sustentabilidade e InterdisciplinaridadeAt: EACH/USP, São Paulo Volume: ISBN 9788564842458.
14. **Ibarra-Espinosa S.**, Ynoue R., and Andrade MF. (2017). High Resolution vehicular emissions inventory in Shanghai China: Application of VEIN model. Japan Geoscience Union (JPGU) meeting, Chiba, Japan from May 20 th to 25 th , 2017.
15. **Ibarra-Espinosa S.**, Ynoue R. 2017. Strategies to cut vehicular gree house emissions. São Paulo School of Advanced Science on Climate Change: Scientific basis, adaptation, vulnerability and mitigation. Instituto de Astronomia, Geofísica e Ciências Atmosféricas. Universidade de São Paulo, 03-15 July 2017, São Paulo, Brazil.
16. **Ibarra S.** and Ynoue R. (2016). REMI model: Bottom-up emissions inventories for cities with lack of data. 21

- International Transport and Air Pollution Conference “TAP 2016”. Lyon, France from May 24 th to 26 th , 2016.
17. **Ibarra S.**, Vara-Vela A., Rehbein A., Ynoue R. (2015). High resolution air pollutant simulation for the Metropolitan Region of Porto Alegre. In: IX Workshop Brasileiro de Micrometeorologia, 2015, Santa Maria.
  18. **Ibarra S.**, Vara-Vela A., Rehbein A. (2015). ANALYZING IPCC GLOBAL CLIMATE MODELS WITH rWBclimate IN SOUTHAMERICA. In: Mudanças Climáticas em São Paulo: Causas, Impactos e Soluções, 2015, São Paulo, Brazil.
  19. **Ibarra S.**, Vara-Vela A., Ynoue R. (2015). Vehicular bottom-up emissions inventory and atmospheric simulation for 58 urban centers of South America. In: 11th International Conference on Southern Hemisphere Meteorology and Oceanography, 2015, Santiago.
  20. **Ibarra S.**, Ynoue R. and Vara-Vela A. (2014). Development and evaluation of a vehicular emissions inventory based in traffic counts for Metropolitan Region of São Paulo. Joint 13th IGAC Science Conference and 13th Quadrennial iCACGP Symposium held at Natal Convention Center (NCC), Natal, Brazil, from September 22 to 26, 2014.
  21. **Ibarra S.**, Campos, D., Abrutzky, R., Cortés, C., Matus, P., Davidowski, D. and Amin, M. (2012) Pronóstico de CO y NOx con varias técnicas estadísticas en Buenos Aires, in dos Santos Alfonso, M. and Torres Sánchez, R.M. (Eds.): Ciencia y Tecnología Ambiental. Un enfoque integrador, Asociación Argentina para al Progreso de las Ciencias, Buenos Aires.
  22. **Ibarra S.** y Salim J. (2011). Estimación de las emisiones de carreteras de la Región Metropolitana aplicando metodologías Copert III y IV. Estudio presentado en VII Jornadas Chilenas de Física y Química Ambiental, Universidad Católica de la Santísima Concepción, Julio 2011, Concepción, Chile.
  23. **Ibarra S.** González-Barrientos J y Salim J. (2011). Influencia del césped en la estimación de material particulado resuspendido de calles. Estudio presentado en VII Jornadas Chilenas de Física y Química Ambiental, Universidad Católica de la Santísima Concepción, Julio 2011, Concepción, Chile.
  24. **Ibarra S.**, Donoso C., Gutiérrez L., Mera E., Leiva M. (2009). Partículas Ultrafinas y su efecto en la salud: oportunidades y desafíos. Estudio presentado en Primer Congreso de Nano-tecnología, Universidad Técnica Federico Santa María, Mayo 2009, Valparaíso Chile.
  25. **Ibarra S.**, Abrutzky R., Caneo K., Matus P., Dawidowski L y Romero-Lankao P. (2009). Efecto del monóxido de carbono en la mortalidad de las ciudades de Buenos Aires, Argentina y Santiago, Chile. Estudio presentado a V Congreso Latinoamericano de Física y Química Ambiental, Sociedad de Química Ambiental de Chile, Octubre 2009, Arica, Chile.
  26. **Ibarra S.**, Matus P., Gutiérrez L., y Mera E. (2009). Efectos de contaminantes atmosféricos en enfermedades respiratorias de mayores de 65 años en Pudahuel. Estudio de series con interacción ozono-temperatura. V Congreso Latinoamericano de Física y Química Ambiental, Sociedad de Química Ambiental de Chile, Octubre 2009, Arica, Chile.
  27. Matus P., **Ibarra S.** (2008). Efecto de la Contaminación Atmosférica en las Enfermedades Respiratorias, en la Comuna de Pudahuel, 2001 al 2005. Estudio presentado en XXXI Congreso Interamericano de Ingeniería Sanitaria y Ambiental, Octubre 2008, Santiago, Chile.
  28. **Ibarra S.**, Mera E., Da Silva L. (2008). Material Particulado MP2.5 e Infecciones Respiratorias Agudas. Estudio presentado en XVI Simposio Chileno de Física, Universidad Técnica Federico Santa María, Noviembre 2008, Valparaíso Chile.

## Books

1. Ropkins K., **Ibarra-Espinosa S.A.**, Bernard, Y. 2020. Vehicle Emissions Measurement and Modeling in: Khreis H., Nieuwenhuijsen M., Zietsman J., Ramani T. Traffic-Related Air Pollution. 1 edition. ISBN: 9780128181225. Elsevier. <https://www.elsevier.com/books/traffic-related-air-pollution/khreis/978-0-12-818122-5>
2. Ibarra-Espinosa, Sergio. 2018. “VEINBOOK: Estimating vehicular emissions with the R package VEIN”. Self-published book on AMAZON; Paperback, <https://www.amazon.com/dp/1791571158>, Kindle: <https://www.amazon.com/dp/B07L7XRFKC>, ISBN-13: 978-1791571153, ISBN-10: 1791571158.

## Software

1. **Sergio Ibarra-Espinosa** (2020). **vein**: Vehicular Emissions Inventories. R package version 0.9.1.1. <https://atmoschem.github.io/vein> and <https://CRAN.R-project.org/package=vein>.
2. **Sergio Ibarra-Espinosa**, Daniel Schuch and Edmilson Dias de Freitas (2018). **elexport**: Export Emissions to Atmospheric Models. R package version 0.5.0. <https://atmoschem.github.io/elexport> and <https://CRAN.R-project.org/package=elexport>.
3. **Sergio Ibarra-Espinosa** (2018) **cptcity**: incorporating the cpt-city archive into R. R package version 1.0.0. <https://CRAN.R-project.org/package=cptcity>.
4. **Sergio Ibarra-Espinosa** and Amanda Rehbein (2018). **ratmos**: Tools for handle and plot output of earth models. R package version 0.1.3. <https://github.com/ibarraespinosa/ratmos/>.
5. Daniel Schuch and **Sergio Ibarra-Espinosa** (2018). **EmissV**: Vehicular Emissions by Top-Down Methods. R package version 0.664.5. <https://CRAN.R-project.org/package=EmissV>.
6. **Sergio Ibarra-Espinosa** (2020). **wrftools**: Provide tools to run WRF. R package version 0.4.7. <https://github.com/atmoschem/wrftools>.
7. Rehbein, A., Ambrizzi, T., **Ibarra-Espinosa, S.**, Dutra, L. M. M.: **raytracing**. Rossby Wave Ray Tracing v0.2.0. <https://github.com/salvatirehbein/raytracing>, 2020.
8. **Sergio Ibarra-Espinosa** (2020). **geofabrik**: Downloading Open Street Map Data. R package version 0.1.0. <https://CRAN.R-project.org/package=geofabrik>
9. **Sergio Ibarra-Espinosa** (2020). **respeciate**: Speciation profiles for gases and aerosol. R package version 0.1.0.



- <https://github.com/atmoschem/respeciate>. (port US/EPA speciate 5.0 to R)
10. Sergio Ibarra-Espinosa (2020). **emep**: EMEP EEA Emission factors data-base. R package version 0.1.0. <https://gitlab.com/ibarraespinosa/emep>.

## Media and Press

1. Sergio Ibarra-Espinosa (2018). Software calcula emissões de poluentes por veículo, via e horário. *Jornal da USP*. <https://jornal.usp.br/ciencias/ciencias-ambientais/software-calcula-emissoes-de-poluente-por-veiculo-via-e-horario/>
2. Sergio Ibarra-Espinosa (2018). Sistema mede poluição do ar 'rua por rua' em São Paulo. *BBC NEWS Brasil*. <https://www.bbc.com/portuguese/brasil-44459485>.
3. Sergio Ibarra-Espinosa (2018). Sistema mede poluição do ar 'rua por rua' em São Paulo. *TERRA*. <https://www.terra.com.br/noticias/brasil/sistema-mede-poluicao-do-ar-rua-por-rua-em-sao-paulo.ed1c06f9efd4df1ea9ee56b6ae295bb1qdevdzpd.html>
4. Sergio Ibarra-Espinosa (2018). Sistema mede poluição do ar 'rua por rua' em São Paulo. *UOL*. <https://noticias.uol.com.br/ultimas-noticias/bbc/2018/06/12/sistema-mede-poluicao-do-ar-rua-por-rua-em-sao-paulo.htm>.
5. Sergio Ibarra-Espinosa (2018). Software facilita realização de inventário de emissões veiculares. *Diário Oficial*. [http://diariooficial.imprensaoficial.com.br/nav\\_v4/index.asp?c=5&e=20180628&p=1](http://diariooficial.imprensaoficial.com.br/nav_v4/index.asp?c=5&e=20180628&p=1)

## Teaching

1. YOUTUBE CHANNEL [https://www.youtube.com/channel/UC2oYaS9mpnIDk8w55O8\\_bTg](https://www.youtube.com/channel/UC2oYaS9mpnIDk8w55O8_bTg)
2. 27-02-2020: Universidade de São Paulo (USP). Curso sobre VEIN. <https://www.iag.usp.br/atmosfericas/vein>.
3. 16-08-2018: Universidade de São Paulo (USP). Curso de R para meteorologia IAG/USP. <https://iagdevs.github.io/cursoR/>.
4. 19-03-2018: Universidade Federal de São Paulo (UNIFESP). Environmental Engineering- 'Controle de Poluição Atmosférica'. Class: 'Estimativas de fontes fixas/móveis e inventários'. Professor Dr. Gyrleene Silva.
5. 16-10-2017 'O modelo VEIN' in CETESB, SP, Brazil.
6. 27-11-2017 to 1-12-2017 'O modelo VEIN' in Departamento de Engenharia Sanitária e Ambiental (DESA), Universidade Federal de Minas Gerais, Grupo de Poluição do Ar e Meteorologia Aplicada (GPAMA), Prof. Dr. Taciana Albuquerque.

## Awards

- Best PhD 2018 in Atmospheric Sciences. Destaque Doutorado Meteorologia Sergio Alejandro Ibarra Espinosa. Departamento de Ciências Atmosféricas Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo
- PhD Scholarship from Chilean Government: "Becas Chile"
- Master Scholarship from "Centro Nacional del Medio Ambiente" Scholarship.
- Travel grant from organization to the 2017 Japan Geoscience Union (JPGU) meeting, Chiba, Japan.
- Travel grant from IAG/USP to European Geosciences Union General Assembly Vienna | Austria 2018.
- Travel Grant from organization to 11th International Conference on Southern Hemisphere Meteorology and Oceanography, 2015, Santiago.
- Travel grant from organization 2018 Joint 14th iCACGP Quadrennial Symposium IGAC.