

Andrés Salomón Fielbaum Schnitzler

Curriculum Vitae

Email: fielbaum@gmail.com, andres.fielbaum@sydney.edu.au

Website: www.andresfielbaum.com

Summary

Mathematical Engineer, M.Sc. in Transports Engineering and Ph.D. in Systems Engineering, all approved with highest distinction at Universidad de Chile. Experience as a postdoc at TU Delft, main and assistant external lecturer in Universidad Santa María and Universidad de Chile, and as a researcher in Universidad de O'Higgins. Researcher in public transport, transport economics, combinatorial optimization and transport networks. First prize as young researcher for World Conference on Transport Research Conference 2019, President of FECh (Universidad de Chile students' union) and spokesman of university students at a national level 2013. Currently a Lecturer (Assistant Professor) at the School of Civil Engineering at the University of Sydney.

Personal information

Full name: Andrés Salomón Fielbaum Schnitzler.

Date of birth: January 15th, 1987.

Nationality: Chilean/German.

Civil status: Married.

Research interests

Public transport, Combinatorial optimization, Transport economics, Transport algorithms and dynamics, New transport technologies, Urban-transport interactions.

Timeline

2005-2010 Mathematical Engineering student

2010-2013 Student leadership at a Faculty, University and national level

2011-2014 M.Sc. in Transports Engineering student

2014-2015 Work as a researcher at ISCI (Institute of Complex Systems Engineering) in Universidad de Chile

2015-2018 Lecturer of Probabilities and Statistics at Universidad Federico Santa María

2015-2019 Ph.D. in Engineering Systems student

2017-2019 Lecturer of a practical workshop at Universidad de Chile

2019-2019 Work as a researcher at Universidad de O'Higgins

2019-2023 Postdoc at the Cognitive Robotics Department, TU Delft

2023- Lecturer at the School of Civil Engineering, University of Sydney

Education

- Mathematical Engineer, Universidad de Chile, 2014. Thesis: Identificación y análisis de estructuras óptimas de líneas de transporte público en redes representativas con demanda paramétrica [Identification and analysis of optimal lines structures for public transport systems, over representative networks with parametric demand].
 - Master in Transport Engineering, Universidad de Chile, 2014. Same thesis than for the Mathematical Engineer degree.
 - Ph.D. in Systems Engineering, Universidad de Chile, 2019. Thesis: Effects of the introduction of spatial and temporal complexity on the optimal design, economies of scale and pricing of public transport.
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Lecturing experience

- Practical workshop: Design of a public transport system for Santiago. Universidad de Chile, 2017-2019.
- Probabilities and Statistics, Universidad Federico Santa María, campus San Joaquín. 2015-

2018.

- More than 10 courses as assistant lecturer at Universidad de Chile, 2007-2011.
- Participated in several thesis committees.

Supervised theses

- “Incorporation of Reservations in an on-Demand Ridesharing System” M.Sc. thesis defended by Nander Theodoridis (TU Delft, graduated 2022, co-supervised with Dr. Javier Alonso-Mora and Dr. Bilge Atasoy)
- “Shared Mobility-on-Demand Systems: Reducing Service Unreliability” M.Sc. thesis defended by Mees Matthieu (TU Delft, graduated 2022, co-supervised with Dr. Javier Alonso-Mora).
- “Fairness in Mobility on Demand Systems with Ride-Sharing” M.Sc. thesis defended by Pieter Schuller (TU Delft, graduated 2021, co-supervised with Dr. Javier Alonso-Mora).

Currently co-supervising the following M.Sc. theses: Francisco Vilches (U. de Chile) who is analyzing how Contraction Hierarchies can impact design aspects of on-demand ridepooling, Valentina Gómez (U. de Chile), who is studying heuristics to design public transport networks, and Matías Salinas (U. de Chile) who is designing a flexible public transport network for Punta Arenas.

Awards, Scholarships and Projects

- Postdoc 2019-2023 in the project “Postdoc: Shared Mobility-on-Demand under Uncertainty”, in collaboration with Didi Udian Shenzhen.
- Currently collaborating with the public transport agency from Santiago, Chile, in the project “Potential use of on-demand ridepooling to complement public transport networks”
- Prize “Cátedra Abertis-PUC” 2020, to the best thesis in transportation science defended in Chile during 2019.
- First prize in grants for worldwide young researchers to attend the World Conference on Transport Research 2019.
- Scholarship provided by the University for my Ph.D. studies.

- Scholarship provided by the Government for my M.Sc. studies.
 - Ranked first among my cohort in all my academic degrees.
 - Students' honour list, Universidad de Chile, 2005-2009.
 - National score at the Chilean Test to apply to Universities (2004).
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Academic presentations

A. Invited talks

- Learning and Autonomous Control Seminar Series, TU Delft, January 2023. "Towards the utilisation of on-demand ridepooling in public transport systems"
- Talk at Eindhoven AI Systems Institute, TU Eindhoven, November 2022. "Towards integrating on-demand pooled services into public transport networks".
- AGCO (Algorithms, Combinatorics, Game Theory and Optimization) Seminar Series, Universidad de Chile, April 2022. "How to split the costs and charge the travellers sharing a ride? aligning system's optimum with users' equilibrium".
- Optimization and Algorithms Seminar Series, Universidad de O'Higgins, March 2022. "Improving the assignments between users and vehicles in on-demand ridepooling".
- Transportation Seminar Series, Universidad de Chile, March 2022. "On-demand ridepooling: Potential and challenges".
- Talk at Georgia Tech, March 2022. "On-demand ridepooling: Potential and challenges".
- Talk at University of Maryland, March 2022. "On-demand ridepooling: Potential and challenges".
- Learning and Autonomous Control Seminar Series, TU Delft, November 2021. "Analysis and improvement of on-demand ridepooling systems".
- Smart Public Transport Lab Webinar Series, TU Delft, September 2021. "Strategic design of public transport networks, frequencies and bus sizes".
- Vrije Universiteit Amsterdam Eureka Webinar Series, January 2021: "New sources of unreliability in on-demand ridesharing systems".
- Working for an app-based company in Chile Seminar Series, Universidad Autónoma de Chile, October 2020. "Algorithms and workers' rights".
- AGCO (Algorithms, Combinatorics, Game Theory and Optimization) Seminar Series,

Universidad de Chile, June 2020. “A Water-Filling Primal-Dual Algorithm for Approximating Non-Linear Covering Problems”.

- Operations Research Privatissimum, Technical University of Munich, November 2018. “Optimal design for a public transport bus system considering routes, frequencies and vehicle sizes in a general city model”.
- Ph.D. in Systems Engineering Seminar Series, Universidad de Chile, May 2017. “Identification and analysis of optimal lines structures for public transport, in representative networks with parametric demand”.

B. Organization of special sessions in Conferences

- Scientific Conference *Reinventing the City*, at the Amsterdam Institute for Advanced Metropolitan Solutions, to be held in February 2022. Organized the special session “On-demand services and public transport networks – the prospects of synergy”. (Video of the presentation available [here](#)).
- Chilean Conference on Transportation Engineering 2021, Online (due to COVID-19). Organized and presented in the special session “Working as a driver/rider in online transportation apps”.

C. Regular presentations in Conferences

- IATBR 16th Conference, December 2022, Santiago, Chile. “How Openness to Sharing Impacts the Total Vehicle Kilometres with Shared Automated Vehicles: A Theoretical Analysis”.
- Bridging Transportation Researchers 2022, August 2022, Online. “Unreliability in ridesharing systems: Measuring changes in users’ times due to new requests”.
- ITEA Annual Conference and school on Transportation Economics, June 2022, Toulouse, France. “Beyond the last-mile: different spatial strategies to integrate On-Demand services into Public Transport in a simplified city”.
- hEART Symposium of the European Association for Research in Transportation, June 2022, Leuven, Belgium. “The job of public transport, ride-hailing and delivery drivers: conditions during the COVID-19 pandemic and implications for a post-pandemic future”.
- Chilean Conference on Transportation Engineering 2021, Online (due to COVID-19). “Anticipatory routing methods for an on-demand ridepooling mobility system”.
- INFORMS Institute for Operations Research and the Management Sciences Annual Meeting 2021, Online (due to COVID-19). “How to split the costs among travellers sharing a ride?”

Aligning system's optimum with users' equilibrium".

- ITEA Annual conference and school on transportation economics, June 2021, Online (due to COVID-19). "New sources of economies and diseconomies of scale in on-demand ridepooling systems and comparison with public transport".
- ITF Pre-Summit Research Day on Transport Innovation for Sustainable Development: Reshaping Mobility in the Wake of Covid-19 2021, Online (due to COVID-19). "Driving in the middle of a pandemic: Public transport, ride-hailing and delivery drivers during COVID-19 in Santiago, Chile"
- hEART Symposium of the European Association for Research in Transportation 2020, Online (due to COVID-19). "Unreliability in ridesharing systems: Measuring changes in users' times due to new requests".
- INFORMS Institute for Operations Research and the Management Sciences Annual Meeting 2020, Online (due to COVID-19). "On-demand ridesharing with optimized pick-up and drop-off walking locations".
- ISTS Integrated and Sustainable Transportation Systems, Online (due to COVID-19). "Optimizing a vehicle's route in an on-demand ridesharing system in which users might walk" .
- ICALP International Colloquium on Automata, Languages and Programming 2020, Online (due to COVID-19). "A water-filling primal-dual algorithm for approximating non-linear covering problems".
- World Conference on Transport Research 2019, Mumbai, India. "The technical dimensions behind scale economies induced by transit lines structures design".
- World Conference on Transport Research 2019 (Young Initiative), Mumbai, India. "Public transport design using autonomous vehicles and other new technologies".
- Workshop of transport economics, November 2018, Con Con, Chile. "New developments in transit design considering peak and off-peak conditions: buses full in the off-peak and the case with two fleets".
- EMIC Latin America meeting of students in modelling, engineering and sciences, October 2018, Santiago, Chile, "Optimal fleet size, frequencies and vehicles capacities considering peak and off-peak periods in public transport".
- ITEA Annual Conference and School on Transportation Economics, June 2018, Hong Kong, China. "Optimal fleet size, frequencies and vehicles capacities considering peak and off-peak

periods in public transport”.

- Workshop of Transport Economics, November 2017, Con Con, Chile. “Sources of Economies of Scale and Optimal Pricing in Public Transport”.
 - ITEA Annual Conference and School on Transportation Economics, June 2017, Barcelona, Spain. “Optimal transit lines structures on a general parametric city: the role of heuristics”.
 - Urbanics 3, March 2017, Pucón, Chile. “A parametric description of cities for the normative analysis of transport systems.”
 - Chilean 6th Urban design conference, November 2016, Valparaíso, Chile. “Proposal of an urban model for the design of public transport”.
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Other academic-related activities

- Regular reviewer for several Journals and Conferences, including: Transportation Research Part B, Transportation Research Part C, Operations Research, Journal of Public Economics, IEEE Transactions on Intelligent Transportation Systems, Transportation, Journal of Transport Economics and Policy, Transportmetrica A, Transportmetrica B, Journal of Advanced Transportation, IPCO Conference, Annals of the American Association of Geographers, among others.
 - Participation in the M.Sc. defence committee of Macarena Villalobos (U. de Chile, 2018), Esteban Muñoz-Paulsen (U. de Chile, 2019), and Timo van Frankenhuyzen (TU Delft, 2022).
 - Participation in the Ph.D. candidacy defence committee of Raul Ramos (U. Católica de Chile, 2021).
 - Participation in several academic seminars on public transport and on new transport technologies.
 - Published articles in the official magazine of Universidad de Chile.
 - Participation in discussion about transportation in the Chilean Parliament, radios, TV and newspapers.
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Other non-academic activities

- President of Federación de Estudiantes de Universidad de Chile (2013).

- Spokesman of Confederación de Estudiantes de Chile (2013).
 - President of Centro de Estudiantes de Ingeniería, Universidad de Chile (2011).
 - Written articles for Le Monde Diplomatique and other published and online newspapers.
 - Participation in panels about youth and politics in Universidad Iberoamericana de Puebla, Mexico and in Bogotá, Colombia (2013).
 - Participation in “Expert consultation on the rights to freedom of peaceful assembly and of association of groups most at risk”, Office of the High Commissioner for Human Rights, United Nations, Geneva, Switzerland (2013).
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Chapters in books of general interest

- The Emergence of Youth in Criticism and Power Building: the chilean experience, in Soto, O., & Sánchez Díaz de Rivera, M., (2017) The power today. México DF, México. Editorial Universidad Iberoamericana. ISBN: 978-607-7901-68-6.
 - Struggle for rights is to defend democracy, in Le Monde Diplomatique (2016), Another politics is posible: searching for alternatives. (Otra política es posible: buscando alternativas). Santiago, Chile. Editorial Aún Creemos en los Sueños.
 - The challenges for a new cycle of struggle in Le Monde Diplomatique (2013). Alternatives (Social movements, political fights). (Alternativas: movimientos sociales, luchas políticas). Santiago, Chile. Editorial Aún Creemos en los Sueños.
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Relevant skills

- Languages: Spanish (native), English (advanced), German (basic), French (basic).
- Computational skills: Matlab (advanced), Latex (advanced), QGIS (basic).

Complete list of scientific publications

A. Journal papers

1. [Fielbaum, A., Morales, I. & Verschae, J. \(2022\). A Water-Filling Primal-Dual Algorithm for Approximating Non-Linear Covering Problems. *SIAM Journal on Discrete Mathematics*, 36\(4\), 2889-2915.](#)
2. [Fielbaum, A., Ruiz, F., Boccardo, G., Rubio, D., Tirachini, A., & Rosales-Salas, J. \(2022\). The job of public transport, ride-hailing and delivery drivers: conditions during the COVID-19 pandemic and implications for a post-pandemic future. *Travel Behavior* doi.org/10.1016/j.tbs.2022.11.004.](#)
3. [Bai, X., Fielbaum, A., Kronmueller, M., Knoedler, L., and Alonso-Mora, J. \(2022\). Group-based Distributed Auction Algorithms for Multi-Robot Task Assignment. *IEEE Transactions on Automation Science and Engineering*. doi: 10.1109/TASE.2022.3175040.](#)
4. [Fielbaum, A., Kucharski, R., Cats, O., Alonso-Mora, J. \(2022\). How to split the costs and charge the travellers sharing a ride? Aligning system's optimum with users' equilibrium. *European Journal of Operational Research* 301\(3\), 956-973.](#)
5. [Fielbaum, A., Kronmuller, M., & Alonso-Mora, J. \(2022\). Anticipatory routing methods for an on-demand ridepooling mobility system. *Transportation*. doi.org/10.1007/s11116-021-10232-1](#)
6. [Fielbaum, A. \(2022\). Optimizing a vehicle's route in an on-demand ridesharing system in which users might walk. *Journal of Intelligent Transportation Systems: Technology, Planning and Operation* 26\(4\), 432-447 \(Video of the presentation at ISTS 2020 available \[here\]\(#\)\).](#)
7. [Fielbaum, A., Bai, X., & Alonso-Mora, J. \(2021\). On-demand ridesharing with optimized pick-up and drop-off walking locations. *Transportation Research Part C: Emerging Technologies*, 126, 103061 \(Video of the presentation at INFORMS 2020 available \[here\]\(#\)\).](#)
8. [Fielbaum, A., & Jara-Díaz, S. \(2021\). Assessment of the socio-spatial effects of urban transport investment using Google Maps API. *Journal of Transport Geography*, 91, 102993.](#)
9. [Kucharski, R., Fielbaum, A., Alonso-Mora, J., & Cats, O. \(2021\). If you are late, everyone is late: late passenger arrival and ride-pooling systems' performance. *Transportmetrica A: Transport Science*, 17\(4\), 1077-1100.](#)
10. [Fielbaum, A., & Tirachini, A. \(2021\). The sharing economy and the job market: the case of ride-hailing drivers in Chile. *Transportation*, 48\(5\), 2235-2261.](#)
11. [Fielbaum, A., & Alonso-Mora, J. \(2020\). Unreliability in ridesharing systems: Measuring changes in users' times due to new requests. *Transportation Research Part C: Emerging Technologies*, 121, 102831. \(Video of the presentation at Hearts 2020 available \[here\]\(#\)\).](#)

12. [Fielbaum, A., Jara-Díaz, S., & Gschwender, A. \(2020\). Lines spacing and scale economies in the strategic design of transit systems in a parametric city. *Research in Transportation Economics*, 100991.](#)
13. [Jara-Díaz, S., Fielbaum, A., & Gschwender, A. \(2020\). Strategies for transit fleet design considering peak and off-peak periods using the single-line model. *Transportation Research Part B: Methodological*, 142, 1-18.](#)
14. [Fielbaum, A., Jara-Díaz, S., & Gschwender, A. \(2020\). Beyond the Mohring effect: Scale economies induced by transit lines structures design. *Economics of Transportation*, 22, 100163.](#)
15. [Fielbaum, A. \(2020\). Strategic Public Transport Design Using Autonomous Vehicles and Other New Technologies. *International Journal of Intelligent Transportation Systems Research* 18, 193-201.](#)
16. [Fielbaum, A., Jara-Díaz, S., & Gschwender, A. \(2018\). Transit line structures in a general parametric city: The role of heuristics. *Transportation Science*, 52\(5\), 1092-1105.](#)
17. [Jara-Díaz, S., Fielbaum, A., & Gschwender, A. \(2017\). Optimal fleet size, frequencies and vehicle capacities considering peak and off-peak periods in public transport. *Transportation Research Part A: Policy and Practice*, 106, 65-74.](#)
18. [Fielbaum, A., Jara-Díaz, S., & Gschwender, A. \(2016\). Optimal public transport networks for a general urban structure. *Transportation Research Part B: Methodological*, 94, 298-313.](#)
19. [Fielbaum, A., Jara-Díaz, S., & Gschwender, A. \(2017\). A parametric description of cities for the normative analysis of transport systems. *Networks and Spatial Economics*, 17\(2\), 343-365.](#)

B. Conference papers

1. [Kronmueller, M., Fielbaum, A., & Alonso-Mora, J. \(2022\). Routing of Heterogeneous Fleets for Flash Deliveries via Vehicle Group Assignment. In *2022 IEEE 25th International Conference on Intelligent Transportation Systems \(ITSC\)* \(pp. 2286-2291\). IEEE.](#)
2. [Correa, J., Cristi, A., Fielbaum, A., Pollner, T., & Weinberg, S. M. \(2022\). Optimal Item Pricing in Online Combinatorial Auctions. *International Conference on Integer Programming and Combinatorial Optimization* \(pp. 126-139\). Springer, Cham.](#)
3. [Kronmueller, M., Fielbaum, A., & Alonso-Mora, J. \(2021\). On-Demand Grocery Delivery from Multiple Local Stores with Autonomous Robots. *Proceedings of the 3rd IEEE International Symposium on Multi-Robot and Multi-Agent Systems \(MRS 2021\)*.](#)
4. [P. Schuller, A. Fielbaum and J. Alonso-Mora \(2021\). Towards a geographically even level of service in on-demand ridepooling. *2021 IEEE International Intelligent Transportation Systems Conference \(ITSC\)*, 2429-2434 \(Video of the presentation by P. Schuller available \[here\]\(#\)\).](#)
5. [Fielbaum, A., Morales, I. & Verschae, J. \(2020\). A Water-Filling Primal-Dual Algorithm for Approximating Non-Linear Covering Problems. *Proceedings of The 47th International Colloquium on*](#)

Automata, Languages and Programming (ICALP 2020). (Video of the presentation available [here](#)).