

Felipe Montes

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EDUCATION

Doctorate in Engineering; *Organizational Systems, Social Networks*

October 2014

Universidad de los Andes

Bogotá, Colombia

- Winner of the “Distinguished Industrial Engineering Alumni Award” granted by the Alumni Association of Universidad de los Andes (2015).
- Winner of the Ph.D scholarship granted by the excellence center: Ceiba Complex Systems Research Center (2010).
- Dissertation: “The spread of healthy behaviors in social networks through megatrends: a promising strategy for potentiating public health interventions. Universidad de los Andes (2014).

Master of Science in Industrial Engineering; *Organizational Systems*

March 2010

Universidad de los Andes

Bogotá, Colombia

- High honors awarded thesis.
- Winner of Universidad de los Andes Industrial Engineering Department Scholarship for Master Studies (2009).

Bachelor of Science in Industrial Engineering; *Operations research, Decision Theory*

March 2009

Universidad de los Andes

Bogotá, Colombia

- High honors awarded thesis.
- Winner of the Best High School Test Score (ICFES) Scholarship for Undergraduate Studies of the Secretary of Education of Bogotá (2004).

Baccalauréat Scientifique

July 2004

Lycée Français Louis Pasteur

Bogotá, Colombia

Other Courses attended:

- Conversations for action - Professor: Fernando Flores, WEST Pluralistic Networks (Online, 2015)
- Best Practices for Clinical Trials, Hospital Universitario Fundación Santa Fe de Bogotá (Bogotá, 2013).
- Fifth Annual French Complex Systems Summer School –Complex Systems Institute of Paris Ile de France (Paris, 2011).

CURRENT POSITION

Assistant Professor

August 2017 – To date

Director of Master in Analytics for Decision-Making

October 2019 – To date

Global Health Equity Scholar Fellow – Fogarty Institute, NIH (USA)

2018 – 2019

Universidad de los Andes- Department of Industrial Engineering

Bogotá, Colombia

- Teaching, research and consulting in Complex Systems, Network Science, and Analytics.
- Research on diagnosing, designing, and evaluating strategies to intervene complex systems for increasing public health and quality of higher education in communities.
- Teaching of the courses: Complex Systems Seminar (30 students - Master), Social Networks Structure (60 students – Master), Organizational Strategy (70 students - Bachelor).
- Director of the laboratory Social and Health Complexity Center, Universidad de los Andes.
- Projects for designing a model for managing research with the Vicepresidency of Research, and benchmarking academic loads for the Vicepresidency of Academic Affairs at Universidad de los Andes.

CURRENT GRANTS

Project title and role	Funding agency	Project dates
P.I.: <i>isBaru: The importance of social relations in healthy behaviors in rural communities of Colombia</i>	National Institute of Health (USA) Fogarty Grant – D43	2018-2019
P.I.: <i>Relación entre pérdida auditiva, enfermedades alérgicas y actividad física, con los comportamientos sociales de adolescentes en una zona rural de Colombia.</i>	Fundación Santa Fe – Universidad de los Andes	2019-2020
P.I.: <i>Social Analytics: Interviniendo comunidades utilizando análisis de redes sociales para el desarrollo sostenible de Colombia.</i>	Universidad de los Andes - FAPA	2017-2020
Co-PI for Colombia: <i>What makes cities healthy, equitable and environmentally sustainable? Lessons from Latin America.</i>	Wellcome Trust (UK)	2017-2021
Coinvestigator: <i>The MECHANisms of Networks and norms Influence on SMoking in Schools (MECHANISMS) Study: Using Game Theory to assess the effects of social norms and social networks on adolescent smoking in schools - a proof of concept study.</i>	Medical Research Council (Reino Unido)	2018-2020
PI: <i>Análisis del movimiento de adultos de Tuta absoluta entre invernaderos de tomate, para el diseño de un sistema que minimice la incidencia de la plaga y favorezca la persistencia de un virus entomopatógeno</i>	Agrosavia – Universidad de los Andes	2019-2021
Co-PI: <i>Utilización de modelamiento en dinámica de sistemas para evaluar la transición nutricional en el departamento del Tolima: Una estrategia para orientar políticas enmarcadas en el objetivo de desarrollo sostenible 3 (Salud y Bienestar)</i>	Universidad de Ibagué – Universidad de los Andes	2019-2021
Co-investigator: <i>Stanford-Colombia Collaboratory on Chronic Disease Prevention</i>	National Institute of Health (USA) Exploratory Grants – P20	2017-2019

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher

August 2016 – August 2017

Universidad de los Andes – Department of Industrial Engineering

- Lecturer of the courses *Social Networks Analysis* (Master), *Complex Systems Seminar* (Master), *Organizational Strategy* (undergrad),
- Research on Strategies for Intervening Complex Systems for increasing wellbeing in the education and health sectors.

Visiting Researcher

October 2015 – June 2016

Harvard T.H. Chan School of Public Health - Department of Biostatistics

Boston, USA

Universitat de Barcelona - Physics and Computation of Complex Systems Group

Barcelona, Spain

- Analyzed social segregation patterns using social networks methods from a statistical approach for improving community-based interventions planning in rural settings.
- Designed spreading processes using community detection models for improving the efficiency of diffusion processes in social networks.

International Consultant**February 2016 – June 2016***Ministry of Education of Peru - Procalidad project funded by the World Bank.**Lima, Peru*

- Led a multidisciplinary team of six persons in the conceptual framework design of the Information System for Higher Education of Peru (SIES) by applying a complex systems framework.
- Identified the information system members, and designed the system structure, objectives, data entries, operation processes, variables and indicators.

Director of Quality Assurance for Higher Education**September 2014 – October 2015****Deputy Minister for Higher Education (ad interim)***Ministry of Education of Colombia**Bogotá, Colombia*

- Responsible for the Quality Assurance System and Indicators, the Monitoring and Control processes, and the Recognition of Foreign Diplomas for the Higher Education System of Colombia.
- Led a transversal team of 12 persons in the design and implementation of the first published public Multidimensional Model in Colombia (MIDE) for measuring quality of higher education institutions.
- Led a team of 4 persons for modeling the Risk Assessment Model for Higher Education Institutions (IRIS) that increased the efficiency of the monitoring and control processes by 52%.
- Led a team of 16 persons for the design and implementation of a simpler and standardized 100% online based customer service system that improved by 30% the efficiency of the Recognition Process of Foreign Higher Education Diplomas.
- Led a team of 4 persons for the design of a cyclic process for the Quality Assurance Minimum Requirements and Accreditation procedures for higher education programs obtaining in 2015 a 98% of efficiency and clearing 90% of the 2013-2014 backlog.
- Led a team of 7 persons for the design and implementation of the Law 1740 of 2014 for establishing preventive procedures to the monitoring and control process of higher education institutions.
- Coordinated the interinstitutional process for updating the minimum quality conditions for the higher education programs of education, law, accountability and medicine with deputy-ministers of the education, law and health sectors and the Presidency of the Republic.
- Co-authored the Education chapter of the National Development Plan 2014-2018.
- Led a team of 4 persons responsible for the technical secretary the National Council for Higher Education.
- Board member of 5 public universities. Chair of the board in 2 of them.

Associate Consultant**January 2014 – September 2014***Universidad de los Andes – Hospital Universitario Fundación Santa Fe de Bogotá**Bogotá, Colombia*

- Analyzed data and world clinical-enterprise frameworks for proposing a medical school – clinical enterprise joint venture for the next 10 years including the offer of medical specialties.
- Diagnosed the current medical school-clinical enterprise relationship using capacity and financial indicators.

Doctoral Teaching Fellow**September 2010 – August 2014***Universidad de los Andes – Industrial Engineering Department**Bogotá, Colombia*

- Implemented a simulation model as the single junior researcher involved in The Lancet Physical Activity Working Group for potentiating community-based interventions for the promotion of healthy behaviors using Information and Communication Technologies in Schools of Bogotá.
- Lectured the undergraduate courses: *Organizational Strategy*, and *Networks, Games and Altruism: Complexity in human behavior*.
- Advised 15 undergraduate and 3 master students in their theses in the organizational behavior field.
- Analyzed trends and modeled forecasts of higher education offer in Colombia for the design of PhD, MSc, and Young Researchers scholarship programs for the Formation of Human Talent in Science and Technology project.
- Organized Workshops and Working Boards with 4 Governors of Colombia obtaining USD 20M in royalties funds for funding the scholarships program.

Associate Consultant

Do Advertainment - retail sector

April 2013 – November 2013

Bogotá, Colombia

- Conducted statistical analysis for a retail company using sales and loyalty points databases.
 - Identified using network analysis anchor products, products bought together and consumers' profiles for planning and implementing two marketing campaigns.
 - Designed an automatized model for predicting frequency changes of buyers that increased sales in 14% for a specific consumer segment in only two months.
- Designed a statistical model for predicting sales force retention rate for a cosmetic company that uses a direct sales model.

ADDITIONAL INFORMATION

Languages: Spanish (C2), English (C1), French (C2).**Interests:** Organizational Behavior, Analytics, Big Data, Social Networks, Interdisciplinary teams.**Computer Skills:** *Programing languages:* Python, Mathematica, C. *Statistics tools:* SAS, Stata. *Network analysis and visualization:* Gephi, Ucinet, NetLogo. *Decision / Risk Analysis tools:* DPL, Crystal Ball, Hugin, Expert Choice; Rockwell Arena; *Optimization:* Xpress-MP (Mosel).**Hobbies:** Soccer, Chess, Technology, Watching TED.com, French literature.**Groups and associations:**

- Director of the laboratory Social and Health Complexity Center, Universidad de los Andes.
- Member of The Institute of Industrial and Systems Engineers (IISE)
- Member of the Complex Systems Society
- Member of the Network Science Society
- Member of INFORMS
- Member of the Procalidad Higher Education Project Evaluation Board of the World Bank in Peru.
- Member of the Theory of Organizational Systems Research Group (TESO) at Universidad de los Andes
- Affiliated to the Epidemiology Research Group (EpiAndes), School of Medicine, Universidad de los Andes.
- Affiliate member of the Ceiba Foundation (R+D Scholarships), Bogotá, Colombia.
- Affiliate member of the Onnela Lab, Department of Biostatistics, Harvard T.H. Chan School of Public Health.
- Affiliated to the Ceiba Complex Systems Research Center. Ceiba Foundation. Bogotá, Colombia.

Other current academic activities:

- Academic Editor of PLOS ONE
- Lecturer of the Social Networks Analysis course for the Analytics Master Program Summer School (Universidad de los Andes, 2016).
- Academic peer reviewer for the Administrative Department of Science, Technology and Innovation of Colombia (Colciencias):
 - Reviewer of science and technology projects in engineering and organizational behavior.
 - Reviewer for determining academic journals indexation category.
- Academic peer reviewer for science and technology projects for the Cundinamarca Government.
- Member of the evaluation committee for the Rodolfo Llinás PhD scholarships of Fundación Ceiba.
- Peer reviewer for International Academic Indexed Journals in Complex Systems, Engineering, Public Health and Education field.

PUBLICATIONS

Articles

2019

Brent A Langellier, Usama Bilal, **Felipe Montes**, Jose D Meisel, Letícia de Oliveira Cardoso, Ross A Hammond. Complex Systems Approaches to Diet: A Systematic Review. American journal of preventive medicine. Volume 57, Issue 2, pp 273-281.

D Alex Quistberg, Ana V Diez Roux, Usama Bilal, Kari Moore, Ana Ortigoza, Daniel A Rodriguez, Olga L Sarmiento, Patricia Frenz, Amélia Augusta Friche, Waleska Teixeira Caiaffa, Alejandra Vives, J Jaime Miranda, SALURBAL Group (2019). Building a Data Platform for Cross-Country Urban Health Studies: the SALURBAL Study. Journal of Urban Health, Volume 96, Issue 2, pp 311-337.

2018

Felipe Montes, Roberto Jiménez, Jukka-Pekka Onnela. (2018) Connected But Segregated: Social Networks in Rural Villages. Journal of Complex Networks, Volume 6, Issue 5, pp 693-705, <https://doi.org/10.1093/comnet/cnx054>.

2017

Felipe Montes, David Forero, Ricardo Salas, Roberto Zarama (2017). The Challenges of Creating a Ranking: A Colombian Example. International Higher Education, 90, pp 22-24.

Felipe Montes, Augusto Peñaranda, Santiago Correa, Daniel Peñaranda, Juan-Manuel Garcia, Maria Leonor Aparicio, Andrea Ramírez, Mario Castillo. Cochlear Implants Versus Hearing Aids in a Middle-Income Country: Costs, Productivity, and Quality of Life. Otology & Neurotology, 2017 June 2017 - Volume 38 - Issue 5 - p e26–e33.

Peñaranda D, Garcia J, Aparicio M, **Montes F**, Barón C, Jimenez R, Peñaranda A. (2017) Bone Anchored Hearing Aid Skin Complications: Association with surgical technique, quality of life and audiological benefits. Brazilian Journal of Otorhinolaryngology (ISSN 1808-8694) 17 (-), pp. 1808-8694.

2016

Peñaranda, A. , Garcia, J. , Aparicio, M. , **Montes, F.** , Barón, C. , Jiménez, R. and Peñaranda, D. (2016) Auditory Gain, Quality of Life, and Audiological Benefits in Bone-Anchored Hearing Device Users in Fundación Santafé De Bogotá, Colombia. International Journal of Otolaryngology and Head & Neck Surgery, 5, 44-53.

Pablo D. Lemoine, Olga L. Sarmiento, Jose D. Pinzón, José D. Meisel, **Felipe Montes**, Darío Hidalgo, Michael Pratt, Juan M. Zambrano, Juan M Cordovez, Roberto Zarama. TransMilenio, a Scalable Bus Rapid Transit System for Promoting Physical Activity. Journal of Urban Health, 2016, 93:2, pp 256-270.

2014

Meisel JD, Sarmiento OL, **Montes F**, Martinez E, Lemoine P, Valdivia JA, Brownson RC, Zarama R. Network analysis of Bogotá's Ciclovía Recreativa, a self-organized multisectorial community program to promote physical activity in a middle-income country. American Journal of Health Promotion, 2014, 28:5, e127-e136.

2012

Michael Pratt, Olga L Sarmiento, **Felipe Montes**, David Ogilvie, Bess H Marcus, Lilian G Perez, Ross C Brownson, for the Lancet Physical Activity Series Working Group. The implications of megatrends in information and communication technology and transportation for changes in global physical activity. The Lancet, Volume 380, Issue 9838, Pages 282 - 293, 21 July 2012.

Montes, F. Sarmiento, OL. Zarama, R. Pratt, M. Wang, G. Jacoby, E. Schmid, T. Ramos, M. Ruiz, O. Vargas, O. Michel, G. Zieff, S. Valdivia, JA. Cavill, N. Kahlmeier, S. Do the benefits outweigh the costs?: An economic analysis of four international mass recreational programs. *Journal of Urban Health*, Volume 89, Number 1, Springer 2012.

Gregory W Heath, Diana C Parra, Olga L Sarmiento, Lars Bo Andersen, Neville Owen, Shifalika Goenka, **Felipe Montes**, Ross C Brownson, for the Lancet Physical Activity Series Working Group. Evidence-based physical activity interventions: lessons from around the world. *The Lancet*. Volume 380, Issue 9838, Pages 272 - 281, 21 July 2012.

2011

Roberto Zarama, Adriana Diaz, **Felipe Montes**, José David Meisel Donoso, Pablo Lemoine, Juan Calderon, Victor Bucheli. 20 years Guiding the Construction of Social Capital of the Engineering School of Universidad de los Andes, #34 *Revista de Ingeniería*. Universidad de los Andes. Bogotá D.C., Colombia. rev.ing. ISSN. 0121-4993. Edición Especial 2011, pp. 16-24.

2009

Montes, F. Castillo, M. Decision making analysis for different neurosensorial deep hypoacusia treatments in Colombia. Cost-productivity assessment. In *Value in Health*, ISSN: 1098-3015, 2009, 12, 7: p. A455. (Meeting Abstract)

Policy Documents

Sarmiento OL. García J. Higuera-Mendieta D, Useche AF, Wilches MA, Montes F, Morales R, Guzmán LA (2019). Innovaciones Latinoamericanas para Ciudades y Comunidades cada vez más Sostenibles y Saludables: Aprendizajes de América Latina frente al Objetivo de Desarrollo Sostenible número 11 desde la Salud Urbana. Centro de los Objetivos para Desarrollo Sostenible de América Latina (CODS) – ISSN 2665-6655.

Montes F, Guerra AM, Higuera-Mendieta D, De la Vega E, Sarmiento OL Informe de Nuestra Voz en Barú: La importancia del entorno en la salud de los adolescentes en zonas rurales de Colombia (2019). Informe presentado por Universidad de los Andes y Fundación Amor por Barú a la Institución Educativa de Santa Ana.

Rodríguez AL, Montes F, De la Vega E, Sarmiento O, Stephens D. Informe de isBarú: La importancia de los comportamientos sociales en la salud de los adolescentes en zonas rurales de Colombia (2019). Informe presentado por Universidad de los Andes, Florinda International University, y Fundación Amor por Barú a la Institución Educativa de Santa Ana.

El Modelo de Indicadores del Desempeño de la Educación Superior (MIDE): Hacia la Excelencia de la Educación Superior en Colombia. Ministerio de Educación Nacional, 2015. Bogotá, Colombia.

Documento bases para la construcción de los lineamientos de política Pública del sistema nacional de educación terciaria (SNET) Ministerio de Educación Nacional, 2015. Bogotá, Colombia.

Simplificación del proceso de convalidaciones y diseño del manual de criterios para la convalidación. Dirección de Calidad para la Educación Superior, Ministerio de Educación Nacional. Ministerio de Educación Nacional - Resolución 06950/2015.

Diseño del modelo matemático de Indicadores de Riesgo de las Instituciones de Educación Superior (IRIS). Dirección de Calidad para la Educación Superior, Ministerio de Educación Nacional, 2015. Bogotá, Colombia.

Ciclovía Recreativa Implementation and Advocacy Manual. Available at: <http://cicloviarecreativa.uniandes.edu.co>.

Submitted manuscripts under review

Montes F, Jaramillo AM, Meisel JD, Diaz-Guilera A, Valdivia JA, Sarmiento OL, Zarama R, Benchmarking seeding strategies for spreading processes in social networks: an interplay between influencers, topologies and sizes, Scientific Reports (under review).

Jaramillo AM, **Montes F**, Sarmiento OL, Ríos AP, Goldman L, Hunter R, Rodríguez AL, King A Social cohesion emerging in human systems of a community-based physical activity program: Towards a planetary Health, Network Science (under review).

Meisel JD, Istankov I, **Montes F**, Esguerra V, Ramírez A, Sarmiento OL, Valdivia JA. Understanding the obesity transition by socioeconomic status in Colombia at different spatial scales. International Journal of Obesity (under review).

Sarmiento OL, Higuera-Mendieta D, Wilches-Mogollón MA, Guzmán LA, Rodríguez DA, Morales R, Méndez D, Bedoya C, Linares-Vásquez M, Arévalo MI, Martínez Herrera E, **Montes F**, Meisel JD, Useche AF, García E, Triana CA, Medaglia AL, Hessel P, Arellana J, Moncada C, King AC, Diez-Roux A. Urban Transformations and Health: Methods for TrUST--a Natural Experiment Evaluating the Impacts of a Mass Transit Cable Car in Bogotá, Colombia, BMC public health (under review).

Stankov I, Garcia LMT, Masculli MA, **Montes F**, Meisel JD, Gouveia N, Sarmiento OL, Rodríguez D, Hammond RA, Teixeira W, Diez Roux A. A systematic review of transportation interventions and systems-based simulation studies focused on health: Implications for future research . Transportation Research Part D: Transport and Environment (under review)

Peñaranda D, Moreno S, **Montes F**, Garcia JM, Rico Z, Peñaranda A. 15 year follow up of stapedotomy patients : audiological outcomes and associated factors in a middle income country. Audiology and Neuro-Otology (under review).

Navas LP, **Montes F**, Abloghasem S, Salas RJ, Toloo M, Zarama R. Colombian Higher Education Institutions Evaluation, Socio-economic planning sciences (under review).

Álvarez-Rivadulla MJ, Fajardo F, Merchán L, Jaramillo AM, **Montes F**, Muñoz N, Molano A. Interclass relationships and social integration in college, to Higher Education, Higher Education, (under review).

Montes F, Meisel JD, Morales S, Fierro MC, Echeverry N, Lemoine P, Pardo ML, Sánchez SC, Using personal attributes to detect influential individuals in social networks: A case study, Proceedings in Springer's Complexity Series (under review).