



Meet our Research Faculty

# Alejandro Tejedor

Assistant Professor



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## Research Interests

Complex Systems: Network theory, Information Theory.

Earth-surface processes: River deltas and landscape evolution.

Data analysis and modelling in Geosciences.

## Research Collaborations

Prof. Efi Foufoula-Georgiou - University of California Irvine, USA: *River deltas, Arctic deltas, Landscape Evolution, Network theory applications to Geoscience problems.*

Prof. Ilya Zaliapin – University of Nevada, Reno, USA: *Coalescent processes, Self-similarity, River networks.*

Prof. Arvind Singh – University of Central Florida, USA: *Landscape Evolution*

Prof. Douglas Edmonds – Indiana University, USA: *Numerical modelling in river deltas*

Prof. Yamir Moreno – University of Zaragoza, Spain: *Multiplex Networks and Network theory.*

Prof. Holger Kantz and Prof. Matteo Valleriani – Max Planck Institute, Germany: *Network analysis of historic sources.*

## Publications

### Journal articles

Publications in peer-reviewed scientific journals in the last 5 years (from 2016).

For full publication list: <https://www.atejedor.com/publications>  
or [https://scholar.google.com/citations?user=6S2\\_6bwAAAAJ&hl=en](https://scholar.google.com/citations?user=6S2_6bwAAAAJ&hl=en)

Wang, X., A. Tejedor, Y. Wang, Y. Moreno. Unique superdiffusion induced by directionality in multiplex networks. *New J. Phys.* 23 013016 (2021)

Stevens, A., R. Willett, A. Mamalakis, E. Foufoula-Georgiou, A. Tejedor, J.T. Randerson, P. Smyth and S. Wright. Graph-guided regularized regression of Pacific Ocean climate variables to increase predictive skill of southwestern US winter precipitation. *J. Climate* 1–50 (2020)

Zamani, M., A. Tejedor, M. Vogl, F. Krätutli, M. Valleriani, and H. Kantz. Evolution and transformation of early modern cosmological knowledge: a network study. *Scientific Report*, 10, 19822 (2020)

Vulis, L., A. Tejedor, J. Schwenk, A. Piliouras, J. Rowland, and E. Foufoula-Georgiou. Channel network control on seasonal lake area dynamics in arctic deltas. *Geophys. Res. Lett.*, 47, e2019GL086710 (2020).

Valleriani, M., F. Krätutli, M. Zamani, A. Tejedor, C. Sander, M. Vogl, S. Bertram, G. Funke, H. Kantz. The emergence of epistemic communities in the 'Sphaera' corpus: mechanisms of knowledge evolution. *Journal of Historical Network Research*, 3(1), 50-91 (2019).

Tejedor, A., A. Longjas, E. Foufoula-Georgiou, T. Georgiou, and Y. Moreno. Diffusion Dynamics and Optimal Coupling in Directed Multiplex Networks. *Phys. Rev. X* 8, 031071 (2018).

Tejedor, A., A. Longjas, P. Passalacqua, Y. Moreno and E. Foufoula-Georgiou. River deltas as Multiplex networks: A framework for studying multi-process multi-scale connectivity via coupled-network theory. *Geophys. Res. Lett.*, 45, 9681–9689 (2018).

Tejedor, A., A. Longjas, D. Edmonds, I. Zaliapin, T. Georgiou, A. Rinaldo and E. Foufoula-Georgiou. Entropy and Optimality in River Deltas. *PNAS* 114, 11651-11656 (2017).

Tejedor, A., A. Singh, I. Zaliapin, A. Densmore and E. Foufoula-Georgiou. Scale-dependent erosional patterns in steady-state and transient-state landscapes. *Science Advances* 3, e1701683 (2017).

Tejedor, A., A. Longjas, I. Zaliapin, S. Ambroj and E. Foufoula-Georgiou. Network robustness assessed within a dual connectivity framework. *Scientific Reports* 7, 8567 (2017).

Danesh-Yazdi, M., A. Tejedor and E. Foufoula-Georgiou, Self-Dissimilar Landscapes: Revealing the Signature of Geologic Constraints on Landscape Dissection via Topologic and Multi-Scale Analysis. *Geomorphology* 295, 16-27 (2017).

Brondizio E., E. Foufoula-Georgiou, S. Szabo, N. Vogt, Z. Sebesvari, F. G Renaud, A. Newton, E. Anthony, A.V. Mansur, Z. Matthews, S. Hetrick, S.M. Costa, Z. Tessler, A. Tejedor, A. Longjas, J.A. Dearing. The BF-Deltas project - Catalyzing Action Towards the Sustainability of Deltas. *Curr. Opin. Environ. Sustain.* 19, 182-194 (2016).

Szabo, S., E. Brondizio, S. Hetrick, F.G. Renaud, Z. Matthews, R.J. Nicholls, Z. Tessler, A. Tejedor, Z. Sebesvari, E. Foufoula-Georgiou, S. Costa, J.A. Dearing. Population dynamics, delta vulnerability and environmental change: Comparison of the Mekong, Ganges-Brahmaputra and Amazon delta regions *Sust. Sci.* 11, 539-554 (2016).

Sebesvari Z., F.G. Renaud, S. Haas, Z. Tessler, M. Hagenlocher, J. Kloos, S. Szabo, A. Tejedor, C. Kuenzer. A review of vulnerability indicators for deltaic social-ecological. *Sust. Sci.* 11, 575-590. 2016.

Tejedor, A., A. Longjas, R. Caldwell, D Edmonds, I. Zaliapin , E. Foufoula-Georgiou. Quantifying the signature of sediment composition on the topologic and dynamic complexity of river delta channel networks and inferences towards delta classification. *Geophys. Res. Lett.* 43, 3280 (2016).

## Conference communications and seminar

### Invited and keynotes

Tejedor, A. Diffusion Dynamics on Directed Multiplex Networks: The emergence of an optimal coupling and a new regime of superdiffusion. In: Workshop on Characterizing Interactions in Complex Systems - Czech Academy of Sciences, Prague, Czech Republic, November 2019.

Tejedor, A. What can we learn from the emergent connectivity patterns in geomorphic systems? In: GAIA seminar series – Géosciences Montpellier - Université de Montpellier, France, October 2019.

Tejedor, A. A network-theory approach for studying Earth-surface processes. In: 16th International Workshops on Complex Systems and Networks - Humboldt-Universität zu Berlin, Germany, September 2019.

Tejedor, A. Connectivity as a tool to investigate hydro-geomorphic systems. In: Seminar at the Key Laboratory of Water Cycle and Related Land Surface Processes, CAS - Beijing, China, September 2019.

Tejedor, A. What can we learn from the emergent connectivity patterns in geomorphic systems? Keynote in: Non-Equilibrium Flow and Landform Coupling Workshop - Loughborough University, UK, May 2019.

Tejedor, A. Diffusion Dynamics and Optimal Coupling in Directed Multiplex Networks In: Chemnitz-Dresden Focus Meeting on Nonlinear Dynamics and Nonequilibrium Statistical Physics - TU Chemnitz, Germany, January 2019.

Tejedor, A. Understanding River Deltas through the lens of their channel networks In: Asian School of the Environment - Seminars – Nanyang Technological University, Singapore, February 2018.

Tejedor, A. Understanding River Deltas through the lens of their channel networks In: Applied Mathematics - Seminars - Rochester University of Technology, Rochester, NY, January 2018.

Tejedor, A. Modeling multi-process connectivity in river deltas: extending the single layer network analysis to a coupled multilayer network framework In: Fall AGU Meeting, New Orleans, December 2017.

Tejedor, A.. Experimental evidence of scale-dependent erosional patterns in steady-state and transient-state landscapes. In: Geoscience Seminars - University of Nevada, Reno, October 2017.

Tejedor, A.. Delta channel network connectivity. In: CUNY Advanced Science Research Center, New York, September 2016.

Tejedor, A.. Decoding the delta enigma. In: Utrecht University, Utrecht, June 2016.

Tejedor, A., I. Zaliapin. Tokunaga Self-Similarity: Statistical inference and applications to river networks. In: STRESS 4: Connectivity, Non-Linearity, and Regime Transitions in Future Earthscapes Workshop, Lake Tahoe, NV, April 2013.

### **Contributed communications in international conferences and workshops (Last 5 years)**

Broaddus, C., D. Edmonds, S. Toby, E. Foufoula-Georgiou, A. Tejedor, L. Vullis and J. Nienhuis. Simulating Galloway's famous triangle: Testing the hypothesis that rivers, waves, and tides control delta morphology. In: Fall AGU Meeting, Online, December 2020

Ferdowsi, B., J. Gartner, K. Johnson, A. Kasprak, K. Miller, W. Nardin, A. Ortiz, M. Perignon, A. Tejedor. Earthcasting: Geomorphic prediction for society. In: Fall AGU Meeting, Online, December 2020

Vullis, L., A. Tejedor, I. Zaliapin, J. Rowland and E. Foufoula-Georgiou. Characterizing the Distribution of Lakes on Arctic Deltas. In: Fall AGU Meeting, Online, December 2020

Stevens, A., R. Willett, A. Mamalakis, E. Foufoula-Georgiou, P. Le, A. Tejedor, J. Randerson, S. Wright and P. Smyth. Graph-guided regularized regression to improve predictive skill of precipitation at seasonal timescales. In: Fall AGU Meeting, Online, December 2020

Tejedor, A., J. Schwenk, M.G. Kleinhans, P.A. Carling and E. Foufoula-Georgiou. The Braiding Index 2.0: eBI. In: Fall AGU Meeting, San Francisco, December 2019.

Vullis, L., A. Tejedor, J. Schwenk, A. Piliouras, J.C. Rowland, G. Pease and E. Foufoula-Georgiou. Revealing channel network control on seasonal lake area dynamics in Arctic deltas. In: Fall AGU Meeting, San Francisco, December 2019.

Roy, J., A. Tejedor, and A. Singh. Dynamic clusters to infer topological controls on environmental transport on river networks. In: Fall AGU Meeting, San Francisco, December 2019.

Stevens, A., R. Willett, A. Mamalakis, E. Foufoula-Georgiou, J. Randerson, P. Smyth, S. Wright and A. Tejedor. Graph-Guided Regularization for Improved Forecasting of Southwestern US Winter Precipitation. In: Fall AGU Meeting, San Francisco, December 2019.

Tejedor, A. A network approach to investigate River Deltas. In: International Workshop on Dynamical Methods in Data-based Exploration of Complex Systems, Dresden, October 2019.

Tejedor, A., A. Longjas, H. Kantz, E. Foufoula-Georgiou, P. Passalacqua and Y. Moreno. A general framework to study multi-process connectivity: Multilayer Networks. In: EGU, Vienna, April 2019.

Vullis, L., A. Tejedor, J. Schwenk and E. Foufoula-Georgiou. Inferring Surface and Subsurface Lake-Channel Connectivity in Arctic Deltas. In: EGU, Vienna, April 2019.

Tejedor, A., A. Longjas, E. Foufoula-Georgiou, T.T. Georgiou and Y. Moreno. Optimal Coupling in Directed Multiplex Networks: A new type of superdiffusion. In: Conference on Complex Systems, CCS2018, Thessaloniki, Greece, September 2018.



Tejedor, A., A. Longjas and E. Foufoula-Georgiou. River deltas through the lens of their channel networks: Inferring process from form and delta self-organization. In: Conference on Complex Systems, CCS2018, Thessaloniki, Greece, September 2018.

Vullis, L., A. Tejedor, Schwenk, J. and E. Foufoula-Georgiou. Channel-Lake Connectivity in Arctic Deltas. In: Fall AGU Meeting, Washington DC, December 2018.

Singh, A., Z. Wu and A. Tejedor. Interplay of advective and diffusive processes on landscape organization and evolution. In: Fall AGU Meeting, Washington DC, December 2018.

Schwenk, J., A. Tejedor, E. Foufoula-Georgiou and J.C. Rowland. Automatic Extraction of Delta Channel Network Topology. In: Fall AGU Meeting, Washington DC, December 2018.

Tejedor, A., A. Longjas, D. Edmonds, I. Zaliapin, T. Georgiou, A. Rinaldo and E. Foufoula-Georgiou. Optimality and self-organization in river deltas. In: Fall AGU Meeting, New Orleans, December 2017.

Singh, A., A. Tejedor, J.L. Grimaud and E. Foufoula-Georgiou. Experimental evidence of rainfall driven knickpoints. In: Fall AGU Meeting, New Orleans, December 2017.

Longjas, A., A. Tejedor and E. Foufoula-Georgiou. Graph Theory Approach for Studying Food Webs. In: Fall AGU Meeting, New Orleans, December 2017.

Tejedor, A., A. Longjas, and E. Foufoula-Georgiou. Is there a self-organization principle of river deltas? In: EGU, Vienna, April 2017.

Singh, A., A. Tejedor, J.L. Grimaud and E. Foufoula-Georgiou. Experimental evidence of landscape reorganization under changing external forcing: implications to climate-driven knickpoints. In: EGU, Vienna, April 2017.

Singh, A., A. Tejedor, J.L. Grimaud, I. Zaliapin, and E. Foufoula-Georgiou. Quantifying the scale- and process-dependent reorganization of landscape under climatic change: inferences from an experimental landscape. In: Fall AGU Meeting, San Francisco, December 2016.

Tejedor, A., A. Longjas, and E. Foufoula-Georgiou. Is there a self-organization principle of river deltas? In: EGU, Vienna, April 2017.

Singh, A., A. Tejedor, J.L. Grimaud and E. Foufoula-Georgiou. Experimental evidence of landscape reorganization under changing external forcing: implications to climate-driven knickpoints. In: EGU, Vienna, April 2017.

Singh, A., A. Tejedor, A. Densmore, and E. Foufoula-Georgiou. Landscape response to climate change: quantifying a regime shift in transport processes at the onset of reorganization. In: EGU, Vienna, April 2016.

## **Professional activities**

### **Workshop and conference organisation**

Member of Organizing Committee, 12th International Precipitation Conference IPC12, Irvine, CA, June 19-21, 2019.

Co-Organizer of the Data Analytics for Climate and Earth (DANCE) workshop, Lake Arrowhead, CA, March 27-29, 2019.

### **Session organisation in international conferences**

AGU Fall meeting 2020 (Online, December 1-17, 2020).

- Co-organized: "Session: River Deltas: Hydrology, Geomorphology, and Sedimentology".

AGU Fall meeting 2019 (San Francisco, CA, December 12-16, 2019).

- Co-organized: "Session: River Deltas: Hydrology, Geomorphology, and Sedimentology".

- Union Session co-organized: "Data Analytics and Machine Learning Innovation for Climate and Earth Surface Processes".

AGU Fall meeting 2016 (San Francisco, CA, December 9-13, 2019).

- Co-organized: "Comparing and Contrasting Geomorphic Channel Networks".

### **Committees**

AGU selection committee for the Devendra Lal Memorial Medal since 2020

Qualifying Exam PhD candidate Lawrence Vulis at University California, Irvine (January 2021)

### **Referee service for several journals including**

Proceedings of the National Academy of Science (PNAS), Journal of Geophysical Research, Journal of Hydrology, Earth Surface Dynamics, SIAM Journal on Applied Mathematics, Physical Review E, New Journal of Physics, Scientific Reports, Water Resources Research, Earth's Future, Nonlinear Processes in Geophysics and Physica A.

### **Professional memberships**

American Geophysical Union (since 2011)

European Geosciences Union (since 2013)