Dr. José Roberto Nicolás Carlock

National System of Researchers of Mexico (Level 1)
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Professional Profile

José R. Nicolás-Carlock is a researcher interested in the study of natural and social phenomena from the perspective of complexity science. He holds a PhD in Physics from the Institute of Physics of the Autonomous University of Puebla (Mexico) for his work on fractal morphodynamics in nature. As a postdoctoral researcher at the Institute of Legal Research of the National Autonomous University of Mexico (UNAM) he focused on the study of disappearances, political corruption scandals, and procurement corruption in Mexico. He worked as an Advisor at the Electoral Institute of Mexico City, and participated in the design of the Transparency and Access to Information, and the Personal Data Protection National Programs of Mexico 2022-2024. He co-edited "Corruption Networks: Concepts and Applications" (Springer, 2021). Member of the National System of Researchers of Mexico (Level 1). He currently holds a postdoctoral research position at the Institute of Physics of UNAM.

Research interest: *Complexity, Violence, Democracy, Corruption.*
Approaches: *Physics, Networks and Complexity Science, Computational Social Science.*
Programming languages: *Python, Bash.*
Languages: English (Advanced), Spanish (Native).

Professional Experience

Feb 2022 - Jan 2024 (Present)	**Postdoctoral Researcher** Institute of Physics, National Autonomous University of Mexico • Project: *Studying social structure under a complex systems approach: emergence of flexible properties and dynamics of multiplex social networks.* • PI: Dr. Denis Boyer
Jul 2021 - Dec 2021	**Lead Data Analyst** Institute of Legal Research, National Autonomous University of Mexico • Project: *Assessment and design of the National Programs of Transparency and Access to Information, and Personal Data Protection 2022-2024.* • Coordinator: Dr. Issa Luna Pla
Oct 2020 - Feb 2021	**Advisor** Electoral Institute of Mexico City • Office: Electoral Councilor Ernesto Ramos Mega.
Feb 2020 - Sep 2020	**Postdoctoral Researcher** Institute of Legal Research, National Autonomous University of Mexico • Project: *Observatory on the prosecution and administration of justice in cases of forced disappearance. The duty to search and investigate.*

	● PI: Dr. Karina Ansolabehere
Jul 2018 - Dec 2019	**Postdoctoral Researcher** Institute of Legal Research, National Autonomous University of Mexico ● Project: *Transparency, corruption and accountability in Mexico: problems and solutions.* ● PI: Dr. Issa Luna Pla
Jul 2017 - Jun 2018	**Research Assistant** Institute of Physics, Autonomous University of Puebla ● Project: *Auto-organization and auto-assembly phenomena in physics.* ● PI: Prof. José Luis Carrillo Estrada

Education

Professional Studies:

2017 - **PhD in Physics** | *Ad Honorem*
>   Institute of Physics, Autonomous University of Puebla; Mexico.
>   Thesis: *Universality of fractal to non-fractal morphological transitions.*
2012 - **M. Sc. in Physics**
>   Institute of Physics, Autonomous University of Puebla; Mexico.
>   *Vía General Examinations.*
2010 - **B. Sc. in Physics**
>   School of Science, Autonomous University of Oaxaca; Mexico.
>   Thesis: *Magnetic confinement of charged particles in linear and toroidal arrays of coils.*

Additional Training:

2019 - *Law for non-practitioners (Diploma)*
>   Institute of Legal Research, UNAM; México.
2016 - *Summer School on Complexity*
>   New England Complex Systems Institute (NECSI); United States.
2014 - *Hands-On Complex Systems Workshop*
>   International Centre of Theoretical Physics (ICTP); Trieste, Italy.
2013 - *Spring School on the Physics of Complex Systems*
>   International Centre of Theoretical Physics (ICTP); Trieste, Italy.

Honors and Awards

Honors:

2022 - National System of Researchers (SNI): Level 1.
2018 - National System of Researchers (SNI): Entry Level.
2017 - PhD Physics, *Ad Honorem.*

Scholarships and Grants:

2022 - Proyecto de Consejo Nacional de Ciencia y Tecnología (Postdoc)
2020 - Proyecto de Consejo Nacional de Ciencia y Tecnología (Postdoc)
2018 - Programa de Apoyo a Proyectos de Investigación e Innovación Tecnológica (Postdoc)
2013 - Consejo Nacional de Ciencia y Tecnología (PhD)
2011 - Consejo Nacional de Ciencia y Tecnología (MSc)

Teaching

- ***Corruption, Impunity and Complexity (2022)***
  Co-Professor – Graduate Level (In Spanish), Faculty of Political and Social Sciences, National Autonomous University of Mexico, Mexico.
- ***Understanding the phenomenon of corruption using network analysis (2022)***
  Co-Professor – Graduate Level (In Spanish), Center for Research in Philosophy and Law, Universidad Externado de Colombia, Colombia.
- ***Introduction to data and network analysis (2020)***
  Instructor, Institute of Legal Research, UNAM, México.
- ***Electrodynamics (2015), Statistical Physics(2014), Classical Mechanics (2013)***
  Assistant *(Graduate Level)*, Institute of Physics, Autonomous University of Puebla, Mexico.

Academic Publications

ORCID: 0000-0003-4065-372X
Google Scholar: J. R. Nicolás-Carlock

Research Articles:

- 2023 - **Organized crime behavior of shell-company networks in procurement: prevention insights for policy and reform**, Nicolás-Carlock, J. R. and Luna-Pla, I; <u>Trends in Organized Crime</u> (2023);
  Recibido: Feb 22, 2023; Aceptado: Jun 29, 2023; Publicado: Jul 22, 2023.
  doi: https://doi.org/10.1007/s12117-023-09499-w
- 2021 - **Conspiracy of Corporate Networks in Corruption Scandals**, Nicolás-Carlock, J. R. and Luna-Pla, I; <u>Frontiers in Physics</u> (2021); dentro de la Colección Especial: *The Physics of the Law: Legal Systems Through the Prism of Complexity Science.*
  Recibido: Feb 13, 2021; Aceptado: May 14, 2020; Publicado: Jun 9, 2021.
  doi: https://doi.org/10.3389/fphy.2021.667471
- 2020 - **Corruption and complexity: a scientific framework for the analysis of corruption networks**, Luna-Pla, I and Nicolás-Carlock, J. R.; <u>Applied Network Science</u> (2020); dentro de la Colección Especial: *Structure and dynamics of crime.*
  Recibido: Oct 11, 2019; Aceptado: Feb 14, 2020; Publicado: Feb 19, 2020.
  doi: https://doi.org/10.1007/s41109-020-00258-2
- 2020 - **The dynamics of the angular and radial density correlation scaling exponents in fractal to non-fractal morphodynamics**, J. R. Nicolás-Carlock, J. M. Solano-Altamirano, and J. L. Carrillo-Estrada, <u>Chaos, Solitons and Fractals</u> (2020)
  Recibido: Jul 23, 2019; Aceptado: Ene 23, 2020; Publicado: Feb 1, 2020.

doi: https://doi.org/10.1016/j.chaos.2020.109649

- 2019 - **A universal dimensionality function for the fractal dimensions of Laplacian growth**, J. R. Nicolás-Carlock and J. L. Carrillo-Estrada, _Scientific Reports_ (2019).
  Recibido: Ene 5, 2018; Aceptado: Nov 8, 2018; Publicado: Feb 4, 2019.
  doi: https://doi.org/10.1038/s41598-018-38084-3
- 2017 - **Universal fractality of morphological transitions in stochastic growth processes**, J. R. Nicolás-Carlock, J. L. Carrillo-Estrada, and V. Dossetti, _Scientific Reports_ (2017).
  Recibido: Dic 19, 2016; Aceptado: Abr 28, 2017; Publicado: Jun 14, 2017.
  doi: https://doi.org/10.1038/s41598-017-03491-5
- 2016 - **Fractality à la carte: A general particle aggregation model**, J. R. Nicolás-Carlock, J. L. Carrillo-Estrada, and V. Dossetti, _Scientific Reports_ (2016).
  Recibido: Sep 11, 2015; Aceptado: Dic 14, 2015; Publicado: Ene 19, 2016.
  doi: https://doi.org/10.1038/srep19505

Chapters:

- 2021 - **Corruptomics**, J. R. Nicolás-Carlock and I. Luna-Pla in _Corruption Networks: Concepts and Applications_ (eds. O. Granados and J. R. Nicolás-Carlock), _Springer_ (2021).
  doi: https://doi.org/10.1007/978-3-030-81484-7_9
- 2017 - **Fractal to non-fractal morphological transitions in stochastic growth processes**, J. R. Nicolás-Carlock, V. Dossetti, and J. L. Carrillo-Estrada, in _Fractal Analysis - Applications in Health Sciences and Social Sciences_ (ed. F. Brambila), _Intech_ (2017).
  doi: https://doi.org/10.5772/67941

Books:

- 2021 - **Corruption Networks: Concepts and Applications**, O. Granados and J. R. Nicolás-Carlock (Eds.), _Springer_, 1 ed. (2021) ISBN: 978-3-030-81483-0 doi: 10.1007/978-3-030-81484-7

Reviewer for: _Complexity; Applied Network Science; Journal of Physics Communications; Physica A: Statistical Mechanics and its Applications; Soft Matter_

Science Communication

Projects:

- 2019 - **Red Compleja**: Divulgación científica sobre la Ciencia de Redes y Sistemas Complejos en español. [Cofundador]. Web: https://twitter.com/redcompleja
- 2019 - **Complexity Explained**: Divulgación de los conceptos y las ideas fundamentales de la Ciencia de Sistemas Complejos. Cuenta con un sitio web y un documento traducido en diversos idiomas. [Colaborador]. Web: complexityexplained.github.io
- 2018 - **Revista Con-Ciencia**: Revista estudiantil de divulgación científica de la Benemérita Universidad Autónoma de Puebla (BUAP) [Editor/Colaborador]. Web: http://www.ifuap.buap.mx/vinculacion/revistaCon-ciencia.php
- 2015 - **Seminario estudiantil del Instituto de Física de la Benemérita Universidad Autónoma de Puebla** (BUAP) [Cofundador]. Web: http://www.ifuap.buap.mx/seminario/SeminarioEstudiantil.php

Publications:

- 2019 - **Complexity Explained**, M. De Domenico, D. Brockmann, C. Camargo, C. Gershenson, D. Goldsmith, S. Jeschonnek, L. Kay, S. Nichele, J. R. Nicolás-Carlock, T. Schmickl, M. Stella, J. Brandoff, A. J. Martínez Salinas, H. Sayama. doi:10.17605/OSF.IO/TQGNW; Web: complexityexplained.github.io
- 2019 - **Complejidad Explicada** (Traducción), V. C. Valerio Holguín, C. Gershenson, J. L. Herrera, J. H. Martínez, M. Rueda Santos, O. López Corona, G. de Anda Jáuregui, G. Iñiguez, A. J. Morales Guzmán, J. R. Nicolás Carlock.
- 2018 - **Fractalidad: la morfología de lo amorfo**, J. R. Nicolás-Carlock. Revista Estudiantil Con-Ciencia, Benemérita Universidad Autónoma de Puebla (BUAP).

Conferences and Forums:

- 2019 - Tutor y miembro del jurado: **Datatón Anticorrupción** (2019) organizado por la Secretaría Ejecutiva del Sistema Nacional Anticorrupción; Ciudad de México, México; Dic 7, 2019.
- 2019 - **Observatorio de la Corrupción e Impunidad (OCI-UNAM)** en el "Foro Nacional Anti-Corrupción y Justicia Penal" organizado por las ONG's: Documenta, TOJIL y Mexicanos Contra la Corrupción e Impunidad; Ciudad de México, México; Jul 1, 2019.
- 2018 - **Redes de corrupción en México** en el "Conversatorio Solo para incorruptibles" organizado por el Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM-Puebla) en el marco del Día Nacional de la Integridad; Puebla, México.
- 2018 - **Redes de corrupción en México** en el "Foro sobre Impunidad: reflexiones universitarias" organizado por el Instituto de Investigaciones Jurídicas, Universidad Nacional Autónoma de México (IIJ-UNAM); Ciudad de México, México.
- 2016 - **Orden del desorden: Formación de fractales naturales y más allá** en las conferencias en el marco del Día Mundial de la Estadística de la ONU organizadas por el Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM-Puebla); Puebla, México.

Academic Events

Organization:

- 2020 - **Corruption Networks: from data analysis to public policy**, satélite dentro de la Network Science Conference (NetSci) (evento virtual); Roma, Italia; Sep 19. Web: https://sites.google.com/view/netsci2020-corruption-networks/home

Workshops participations:

- 2019 - **Modelos Analíticos de Riesgos de Corrupción en las Contrataciones Públicas,** organizado por la Auditoría Superior de la Federación; Ciudad de México; Oct 24-25, 2019.
- 2018 - **Complex Networks Winter Workshop**, Universidad de Vermont, Centro de Sistemas Complejos; Quebec, Canadá; Dic, 2018.

Talks in Conferences, Seminars and Colloquiums:

- 2021 - **Corporate networks in public procurement corruption scandals**, dentro del satélite Network Approaches to Economic Crime de la Networks 2021 Conference, Jun 29, 2021.

- 2020 - **Redes de corrupción en México: un enfoque desde los sistemas complejos**, en el 3er Encuentro Interpolitécnico y 2o Encuentro Virtual de la Red de Expertos en Sistemas Complejos organizado por el Instituto Politécnico Nacional (evento virtual); Nov 27.
- 2020 - **Corruption and complexity: a scientific framework for the analysis of corruption networks**, en el Satélite Corruption Networks: from data analysis to public policy, dentro de la Network Science Conference (NetSci) (evento virtual); Roma, Italia; Sep 19.
- 2019 - **Redes de corrupción en México: un enfoque desde la ciencia de sistemas complejos**, en la "11a Reunión Temática de Materiales Complejos e Inteligentes" del Instituto de la Benemérita Universidad Autónoma de Puebla; Puebla de Zaragoza, Puebla; Nov 22.
- 2019 - **Redes de gran corrupción en México**, en el Coloquio Queretano de Matemáticas del Instituto de Matemáticas de la UNAM Campus Juriquilla; Juriquilla, Queretaro; Nov 15.
- 2019 - **The structure and dynamics of grand corruption networks: the Mexican case**, Mini-Simposio Corruption Networks: from Data Analysis to Public Policy; Latin American Conference on Complex Networks (LANET); Cartagena, Colombia; Ago 5-9.
- 2019 - **The complexity of political corruption networks**, Latin American Conference on Complex Networks (LANET); Cartagena, Colombia; Ago 5-9.
- 2019 - **The complexity of political corruption networks**, Satélite Criminal Networks (NetCrime) in the Network Science Conference (NetSci); Burlington, Vermont, Estados Unidos; May 27-31.
- 2019 - **Corruption: network science, data analysis, and other interdisciplinary approaches to fight a complex phenomenon**, Satélite Network Science for Social Good (NetSci4SG), Network Science Conference (NetSci); Burlington, Vermont, Estados Unidos; May 27-31, 2019.
- 2018 - **Aplicaciones de la física a fenómenos socio-espaciales: redes de corrupción en México**, X Taller de Materiales Complejos e Inteligentes; Instituto de Física, Benemérita Universidad Autónoma de Puebla (IFUAP); Puebla, México.
- 2018 - **Universality of fractal/non-fractal transitions in stochastic growth processes**, Seminario de Sistemas Complejos y Física Estadística; Instituto de Física, Universidad Nacional Autónoma de México (IF-UNAM); Ciudad de México, México.
- 2018 - **A unifying dimensionality function for fractal/non-fractal morphodynamics**, International Conference on Complex Systems, New England Complex Systems Institute (NECSI); Cambridge, Estados Unidos.
- 2017 - **Universality of fractal/non-fractal transitions in stochastic growth processes**, Conference on Complex Systems, Complex Systems Society (CSS); Cancún, México.
- 2016 - **Universality in morphological transitions of fractal growth processes**, Dynamics Days: Latin-America and the Caribbean; Puebla, México.
- 2015 - (Poster) "Third Infinity Conference" (Conferencia sobre la Física de Sistemas Biológicos y Complejos), Instituto Max Planck para la Química y Biofísica (MPI-BPC); Gottingen, Alemania.
- 2014/2018 - (Posters) Winter Meeting on Statistical Physics.

Last update: August 2023