

# David Davalos

## Academic address

Instituto de Física  
Universidad Nacional Autónoma de México,  
IFUNAM, Marcos Moshinsky building, second floor, office 213f

## Personal Information

- Date of Birth: September 21th of 1990.
  - Place of Birth: Guadalajara Jal., México.
  - Nationality : US citizen, Mexican.
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## Higher Education

- **Ph. D. Physics**  
*Institute of Physics, UNAM, 2015-2020.*
  - **Master of Physics**  
*Institute of Physics, UNAM 2013-2015.*
  - **Bachelor of Physics**  
*Physics department, CUCEI, University of Guadalajara, 2008-2013.*
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## Languages

- Spanish (mother language).
  - English (fluent).
  - German (A1).
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## Publications

- Position representation of single-mode Gaussian channels beyond the Gaussian functional form. David Davalos, Camilo Moreno, Juan-Diego Urbina and Carlos Pineda. Published: *J. Phys. A: Math. Theor.* 53 (2020) 425304.
  - Divisibility of qubit channels and dynamical maps. David Davalos, Mario Ziman and Carlos Pineda. Published: *Quantum* 3, 144 (2019).
  - Positivity and complete positivity of differentiable quantum processes. Gustavo Montes Cabrera, David Davalos and Thomas Gorin. Published: *Phys. Lett. A* 383, 23 (2019).
  - Quantum non-markovianity and localization. David Davalos and Carlos Pineda. Published: *Phys. Rev. A* 96, 062127 (2017).
  - Measuring and using non-markovianity. Carlos Pineda, Thomas Gorin, David Davalos, Diego A. Wisniacki and Ignacio Garcia-Mata. Published: *Phys. Rev. A* 93, 022117 (2016).
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## Preprints

- Fuzzy measurements and coarse graining in quantum many-body systems Carlos Pineda, David Davalos, Carlos Viviescas, Antonio Rosado. *arXiv:2011.03145*.
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## Honors

- Graduated with Honors in the Ph. D. Physics program of UNAM (2020).
  - *Alfonso Caso medal* for being the most distinguished graduated in the year 2015 of the program of “Master on Physical sciences” of UNAM (2017).
  - *Juan Manuel Lozano Mejía Diploma* for distinguished academic performance in the “Master on Physical sciences” program of UNAM (2016).
  - Graduated with Honors in the Master’s degree program of “Master on Physical sciences” of UNAM (2015).
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## Current position

### Postdoctoral researcher at Institute of Physics UNAM

At the Dr. Carlos Pineda’s group for quantum information and quantum optics. The position is devoted to investigation in the theory of imperfect measurement quantum devices and quantum coarse graining. February 1th of 2020, planned to finish by January 31th of 2021.

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## Research experience

- **Research Center for Quantum Information (RCQI), Slovak Academy of Sciences, Bratislava, Slovakia**  
Six visits from 2015 to the present date.  
Ongoing collaboration with Dr. Mario Ziman. Currently it is being devoted to the investigation of structural questions on quantum channels and to quantum networks.
  - **Institute für Theoretische Physik, Regensburg, Germany**  
September of 2016, April of 2017 and March of 2018.  
Collaboration with Dr. Juan Diego Urbina. It was devoted for the research on continuous variable quantum systems.
  - **Departamento de Física “J. J. Giambiagi”, University of Buenos Aires, Argentina; Instituto de Investigaciones Físicas de Mar del Plata, Mar del Plata, Argentina**  
April of 2015.  
Collaboration with Dr. Diego Wisniacki and Dr. Ignacio García Mata. It was devoted to research new and meaningful ways to measure quantum information flux from the environment of quantum systems to the central system.
  - **Other research activities**
    - Research visit/Talk at the *Moscow Institute of Physics and Technology (State University)* for collaboration with Dr. Sergey Filippov. Given the talk titled “Divisibility of quantum channels and entanglement breaking”. Dolgoprudny, Moscow Region, Russia, November 12th-23th of 2018.
    - Research visit at *Universität Wien* under the supervision of Dr. Carlos Pineda. Vienna, Austria, February 14th-24th of 2018 .
    - Research visit/Talk at the *Physikalisches Institut, Albert-Ludwigs Universität Freiburg*, under the supervision of Prof. Dr. Andreas Buchleitner. Given the talk titled “Measuring and using non-markovianity”. Freiburg, Germany, October 5th-30th of 2015.
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## Teaching experience

At the Universidad Nacional Autónoma de México:

- Professor of “Quantum Mechanics”, First semester of 2020.
  - Professor assistant of “Introduction to quantum physics”, Second semester of 2019.
  - Professor assistant of “Selected topics of mathematical and theoretical physics III”, First semester of 2019.
  - Professor of “Computational physics”, second semester of 2017.
  - Professor assistant of “Selected topics of mathematical and theoretical physics II”, Second semester of 2016.
  - Professor assistant of “Selected topics of mathematical and theoretical physics III”, Second semester of 2015.
  - Professor assistant of “Selected topics of mathematical and theoretical physics II”, First semester 2015.
  - Professor assistant of “Selected topics of mathematical and theoretical physics I”, First semester of 2014.
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## Programming Skills

- Advanced knowledge of Mathematica.
  - Advanced knowledge of Julia.
  - C++, Python, and MatLab.
  - Extensive use of GNU/Linux as user and administrator.
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## Current Research interests

- Open Quantum Systems.
  - Quantum Information Theory.
  - Quantum Tensor Networks.
  - Quantum Networks.
  - Foundations of Quantum Theory.
  - Quantum Thermodynamics.
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## Attendance to conferences, given talks and posters

- Congress: *XV Congreso de la investigación científica y tecnológica del pacífico* at Puerto Vallarta, Mexico, August 25-28/2010.
- Congress: *LIII Congreso Nacional de Física* at Boca del Rio, Veracruz, Mexico, October 25-29/2010.
- Summer School: *Applications of Quantum Mechanics: Optics, Chaos, Random Matrices and Quantum Information* at Cuernavaca, Morelos, Mexico, July 11-22/2011.
- Summer school: *Advanced Summer School 2011* at The Physics Department of CINVESTAV-IPN, Mexico city, Mexico, July 25th-29th of 2011.
- Summer School: *XX Escuela de Verano en Física* at UNAM, Mexico city and Cuernavaca, Mexico, July 18th-29th of 2012.
- Summer School: *Tercer Verano de las Matemáticas y Matemáticas Aplicadas* at CIMAT, Guanajuato, Gto. Mexico. July 2th-13th of 2012.

- Summer School: *Applications of Quantum Mechanics II* at Cuernavaca, Morelos, Mexico, July 16th-27th of 2012.
- Summer School: *Applications of Quantum Mechanics III* at Guadalajara Jalisco, Mexico, July 8th-19th of 2013.
- Summer School: *XLIII Latin American School of Physics: ELAF 2013* at Mexico City, Mexico, from July 22th to August 2th of 2013.
- Conference: *VII Reunión Anual de la División de Información Cuántica de la Sociedad Mexicana de Física*. At Cocoyoc, Morelos, Mexico, May 7th-9th of 2014. Presented the poster titled “Non-Markovianity and spin chains”.
- Summer School: *14th Canadian Quantum Information Summer School* at Guelph, Ontario, Canada, June 16-20/2014.
- Student Conference: *11th Canadian Quantum Information Student Conference*. At Guelph, Ontario, Canada, June 23th-27th of 2014. Presented the poster titled “Non-Markovianity and spin chains” .
- Summer School: *QUTE-Europe Summer School* at Smolenice, Slovakia, August 18th-28th of 2014. Given a poster presentation titled “Non-Markovianity and dynamical regimes” .
- Conference/Meeting of the *Division of Quantum Information of the Mexican Academy of Sciences (DICU)* at Ensenada, Mexico, September 23th-25th of 2015. Given a poster presentation titled “Quantum vaults and non-Markovianity”.
- Talk at the *Students seminar of the Instituto de Física UNAM*: “Bóvedas cuánticas y No Markovianidad” (quantum vaults and non-Markovianity), Mexico City, September 7th of 2015 .
- Conference/Talk: *ICF nonlinear physics group’s meeting* at Cuernavaca, Mexico, December 8th-9th of 2015. Presented the talk titled “This year and prospects to the next one: Non-Markovianity and random density matrices” .
- Conference/Talk: *Topics in Quantum Optics* at Cuernavaca, Mexico, February 14th-20th of 2016. Presented the talk titled “This year and prospects to the next: Non-Markovianity and random density matrices” .
- Conference/Meeting of the *Division of Quantum Information of the Mexican Academy of Sciences (DICU)* at Monterrey, NL, Mexico, October 26th-28th of 2016. Presented the poster titled “Quantum non-Markovianity and localization” .
- Conference/Talk: *Gathering: Correlations in Time Series and Many-Body Systems* at Cuernavaca, Mexico, June 18th to July 8th of 2017. Presented the talk titled “Divisibility of quantum channels versus divisibility of dynamical maps: Verifying Lindbladian divisibility”.
- Conference/Talk: *UDG-UNAM-BUAP meeting on quantum information, open systems, time series and correlations* at Cuernavaca, Mexico, January 9th-20th of 2017. Presented the talk titled “Open systems and non-markovianity”.
- Conference/Meeting of the *Division of Quantum Information of the Mexican Academy of Sciences (DICU)* at San Luis Potosí, SLP, Mexico, September 27th-29th of 2017. Presented the poster titled “Divisibility of quantum dynamical maps vs. divisibility of quantum channels” .
- Conference/Talk: *Latin American School of Physics: Quantum Correlations* at Mexico City, Mexico, July 24th to August 4th of 2017. Presented a poster titled “Divisibility of quantum dynamical maps vs. divisibility of quantum channels”.
- Conference/Talk: *Statistical techniques for correlation analysis: Quantum Many-Body Systems and more* at Cuernavaca, Mexico, July 8th to August 4th of 2018. Presented the talk titled “Divisibilidad de canales cuánticos, markovianidad y entrelazamiento”.
- Conference/poster: *Quantum Optics IX* at Cartagena, Colombia, October 21th-27th of 2018. Presented the poster titled “Characterization of singular Gaussian quantum channels”.
- Conference/Meeting *QMath2019* at Aarhus, Denmark, August 12th-16th 2019. Presented the poster titled “Divisibility of quantum channels” .
- Conference/Meeting of the *Division of Quantum Information of the Mexican Academy of Sciences (DICU)* at Puebla, Puebla, Mexico, September 4th-6th of 2019. Presented the talk titled “Divisibility of qubit channels and dynamical maps”.

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## References

- Mario Ziman  
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- Thomas Henry Seligman Schurch  
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