

# Andrea Quezada, PhD.

## Curriculum Vitæ

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## Research Interests

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My research is focused on studying protein-protein interactions and protein self-assembly involved in degenerative disorders, using an interdisciplinary approach from molecular simulations, biochemical and biophysical assays to cell biology.

## Education and Research

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- 01/07/2019 - present **Postdoctoral researcher**. Cell Structure and Dynamics Laboratory. Faculty of Science. University of Lisbon, Portugal.  
*Subject:* Huntingtin aggregation in live-cell models: the role of phosphorylation on aggresome formation and intracellular phase transitions.
- 01/11/2018 - 20/06/2019 **Postdoctoral researcher** Biomolecular Self-Organization Laboratory. Institute of Chemical and Biological Technology. NOVA University of Lisbon. Portugal.  
*Subject:* Studying the molecular mechanism of ATP as an hydrotrope in A $\beta$  aggregation.
- 01/02/2018 – 01/11/2018 **Postdoctoral researcher**. Department of Biochemistry and Structural Biology. Institute of Cell Physiology. The National Autonomous University of Mexico. Mexico City.  
*Subject:* Studying the dynamics of furin and other proprotein convertases upon inhibition by serpins.
- 01/04/2017 - 01/11/2018 **Project Manager**. Mexican Protein Society
- 20/01/2012 - 28/02/2017 **Ph.D.** Biophysical Chemistry Laboratory, Faculty of Chemistry, National Autonomous University of Mexico\*, Mexico City.  
*Subject:* Stability, flexibility and aggregation of ( $\beta\alpha$ )<sub>8</sub> barrels.
- 20/01/2012 – 31/07/2012 **Research visitor** Soft Matter and Molecular Biophysics Group, Department of Applied Physics, Faculty of Physics, University of Santiago de Compostela, Spain.  
*Subject:* Microsecond-long all-atom molecular dynamics simulations of ( $\beta\alpha$ )<sub>8</sub> barrels
- 03/02/2009 - 25/11/2011 **M.Sc.** Department of Biochemistry and Structural Biology, Institute of Cell Physiology, The National Autonomous University of Mexico. Mexico City.  
*Subject:* Chimeragenesis design of ( $\beta\alpha$ )<sub>8</sub> barrels
- 01/09/2009 – 31/01/2010 **Research visitor** Department of Chemistry and Physics, Faculty of Science, University of Granada. Granada, Spain.  
*Subject:* Protein Kinetic stability determination by Differential Scanning Calorimetry
- 18/08/2003 - 26/11/2008 **B.Sc.** Department of Macromolecules, Institute of Chemistry, The National Autonomous University of Mexico. Mexico City.  
*Dissertation Subject:* Obtaining high-quality protein crystals using internal electric fields and voltammetry

\*The largest University in Latin America. #103 in QS Global World Ranking.

## Publications

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### Articles

- [1] Maria Hoyer, Alvaro Crevenna, Radoslaw Kitel, Kherim Willems, Jose Rafael Cabral Correia, **Andrea Quezada**, Mirosława Czub, Grzegorz Dubin, Pol Van Dorpe, Tadeuz Holak, and Don Lamb. Using Zero-mode waveguides to visualize the first steps during gelsolin-mediated actin filament formation. *Submitted*, **2020**.
- [2] **Andrea Quezada**, Joana Branco Santos, Daria Kovalchuk, and Federico Herrera. An integrated framework for Huntingtin aggregation: from classic amyloidogenesis to phase transitions in the cell. *Submitted*, **2020**.
- [3] Gonzalo Izaguirre, Marcelino Arciniega, and **Andrea Quezada**. Specific and Selective Inhibitors of Proprotein Convertases Engineered by Transferring Serpin B8 Reactive-Site and Exosite Determinants of Reactivity to the Serpin  $\alpha$ 1PDX. *Biochemistry*, 58(12):1679–1688, **2019**.
- [4] **Andrea Quezada\***, Nallely Cabrera, Ángel Piñeiro, A Jessica Díaz-Salazar, Selma Díaz-Mazariegos, Sergio Romero-Romero, Ruy Pérez-Montfort, and Miguel Costas. A strategy based on thermal flexibility to design triosephosphate isomerase proteins with increased or decreased kinetic stability. *Biochemical and Biophysical Research Communications*, 503(4):3017–3022, **2018**.
- [5] Valeria Guzmán-Luna, **Andrea Quezada**, A. Jessica Díaz-Salazar, Nallely Cabrera, Ruy Pérez-Montfort, and Miguel Costas. The effect of specific proline residues on the kinetic stability of the triosephosphate isomerases of two trypanosomes. *Proteins: Structure, Function, and Bioinformatics*, 85(4):571–579, **2017**.
- [6] **Andrea Quezada**, A Jessica Díaz-Salazar, Nallely Cabrera, Ruy Pérez-Montfort, Angel Piñeiro, and Miguel Costas. Interplay between Protein Thermal Flexibility and Kinetic Stability. *Structure*, 25(1):167–179, **2017**.

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### Book Chapters

- [7] **Andrea Quezada**, Roberto Arreguín-Espinosa, and Abel Moreno. *Springer Handbook of Crystal Growth*, chapter Protein Crystal Growth Methods, pages 1583–1605. Springer Berlin Heidelberg, 1st edition, **2010**.
- [8] **Andrea Quezada** and Miguel Costas. *Estabilidad cinética de proteínas*, volume XXXIV, pages 61–72. **2010**. (In Spanish).

### Conference Proceedings

- [9] Miguel Costas, **Andrea Quezada**, and Ángel Piñeiro. Interplay between protein kinetic stability and thermal flexibility. *The FEBS Journal*, **2017**.
- [10] Miguel Costas Angel Piñeiro and **Andrea Quezada**. Key structural differences between tbtim and tctim revealed by thermal unfolding molecular dynamics simulations. *Protein Science*, **2015**.

## Skills

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### Technical

- Atomic Force Microscopy, Widefield and Confocal Fluorescence Microscopy, Dynamic Light Scattering, Circular Dichroism, Differential Scanning Calorimetry, Isothermal Scanning Calorimetry.

### Computational

- Languages: Python, R, UNIX shell scripting
- Other tools: Fiji scripting, Gromacs, Amber, Matlab

### Bench

- Cell Biology, Molecular Biology, Protein Biochemistry

## Teaching and Tutoring

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- **Tutoring** 2020 *Daria Kovalchuk* (Bachelor student). Cell Structure and Dynamics Laboratory, Faculty of Science, University of Lisbon, Portugal
- **Tutoring** 2019 *Fabiana Miraglia* (PhD student). Cell Structure and Dynamics Laboratory, Faculty of Science, University of Lisbon, Portugal
- **Tutoring** 2019 *Silvia Galderisi* (PhD student). Biomolecular Self-Organization Laboratory, ITQB-NOVA, Oeiras, Portugal
- **Invited lecturer** Nov 2018. Biochemistry Grad School. Class Title “Protein purification and characterization techniques”. Institute of Cell Physiology, The National Autonomous University of Mexico, Mexico City. *Subject*: Protein Thermodynamics.
- **Lecturer** Ago 2013 - Nov 2018 Thermodynamics. Undergraduate course at Faculty of Chemistry. The National Autonomous University of Mexico, Mexico City.

## Research grants

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- Title: “Estabilidad Termodinámica de Proteínas”; PI: Miguel Costas; Investigator: **Andrea Quezada**; Institution: Programa de Apoyo a la Investigación y al Posgrado (PAIP), Facultad de Química, Universidad Nacional Autónoma de México; Reference: 5000-9018; Amount: \$120,000 (MXN)
- 2010-2016 Title: “Termodinámica de Proteínas”; PI: Miguel Costas; Investigator: **Andrea Quezada**. Institution: Dirección General de Asuntos del Personal Académico (DGAPA), Universidad Nacional Autónoma de México; Reference: IN112813; Amount: \$260,000 (MXN)

## Awards, Fellowships and Honors

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- 2018-2020 **Fellowship** from the Mexican Federal Government for a postdoctoral stay awarded by the National Council of Sciences and Technology (CONACyT)
- 2017 **Cum Laude** PhD dissertation: “Protein flexibility and kinetic stability: the Trypanosomatidae’s Triosephosphate Isomerase case”
- 2016 **Grant** from the Mexican Federal Government under the *Research Assistants Program* awarded by the National Investigators System (SNI)

- 2012-2015 **Fellowship** from the Mexican Federal Government for PhD studies awarded by the National Council of Sciences and Technology (CONACyT)
- 2012 **Fellowship** from the Mexican Federal Government for a short research stay at the University of Santiago de Compostela, Spain
- 2012 **Travel Award** from the Biochemistry PhD Program at UNAM for a short research stay at the University of Santiago de Compostela, Spain
- 2010-2012 **Fellowship** for MsC studies granted by the Mexican National Council of Sciences and Technology (CONACyT)
- 2009 **Fellowship** from the Mexican Federal Government for a short research stay at the University of Granada, Spain
- 2009 **Travel Award** from the Biochemistry PhD Program at UNAM for a short research stay at the University of Granada, Spain
- 2008 **Cum Laude** Bachelor dissertation: "Growing protein crystal under electric fields"
- 2008 **Travel Award** to attend the 12th International Conference on the Crystallization of Biological Macromolecules awarded by the organizer committee.
- 2007-2008 **Grant** under the *Research Assistant Program* awarded by the National Investigators System (SNI) for undergraduate research stay at the Institute of Chemistry, UNAM

## Volunteering

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- 2020 **COVID Testing Centre** at the Faculty of Science of the University of Lisbon. Interview for TecReview: [shorturl.at/rAEW5](https://shorturl.at/rAEW5)

## Communications

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### Oral communications and invited talks

1. **Andrea Quezada**. Invited talk: "Huntingtin aggregation in live cells: amyloidogenesis, phase separation and aggresomes" 3er Coloquio en Materiales de Interés Biotecnológico "Perspectivas en la Salud Humana" (CMIB-2020), *Universidad de Sonora, Mexico*. **2020**.
2. **Andrea Quezada**. Invited talk: "How to modify the kinetic stability of proteins using molecular dynamics simulations?" Instituto Potosino de Investigación Científica y Tecnológica A.C., *San Luis Potosí, Mexico*. **2017**.
3. **Andrea Quezada**, Jessica Diaz-Salazar, Nallely Cabrera, Ruy Perez-Montfort, Ángel Piñeiro and Miguel Costas. Interplay between Protein Thermal Flexibility and Kinetic Stability. *6th Congress of the Mexican Protein Society, Durango, Mexico*. **2017**.
4. **Andrea Quezada**, Nallely Cabrera, Ruy Perez-Montfort, Ángel Piñeiro and Miguel Costas. The structural basis of protein kinetic stability: the Trypanosomatidae's TIM case. *4th Congress of the Mexican Protein Society, Guanajuato, Mexico*. **2013**.

### Poster communications

1. Miguel Costas, **Andrea Quezada**, and Ángel Piñeiro. Interplay between protein kinetic stability and thermal flexibility. *42nd FEBS Congress: from molecules to cells and back, Jerusalem, Israel*. **2017**

2. Angel Piñeiro, Miguel Costas and **Andrea Quezada**. Key structural differences between TbTIM and TcTIM revealed by thermal unfolding molecular dynamics simulations. *29th Annual Symposium of the Protein-Society, Barcelona, Spain. 2015*
3. **Andrea Quezada**, Angel Piñeiro and Miguel Costas. Temperature-induced unfolding molecular dynamics simulations of the triosephosphate isomerase of *Trypanosoma cruzi* and *Trypanosoma brucei*. *XXIX Congress of the Mexican Biochemistry Society, Oaxaca, Oaxaca. 2012*
4. **Andrea Quezada** and Miguel Costas. Kinetic stability of TIM chimeric enzymes. *3rd Congress of the Mexican Protein Society, Mexico City, Mexico. 2011.*
5. **Andrea Quezada** and Miguel Costas. Kinetic stability of chimeric enzymes from the triosephosphate isomerase of *Trypanosoma cruzi* and *Trypanosoma brucei*. *XXVIII Congress of the Mexican Biochemistry Society, Tuxtla Gutiérrez, Chiapas. 2011.*
6. **Andrea Quezada** and Abel Moreno. Effect of an electromagnetic field on the crystallization of ferritin. *12th International Conference on the Crystallization of Biological Macromolecules, Cancún, México. 2008.*

## Memberships

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- Portuguese Biochemistry Society (2020)
- Mexican Protein Society (2018-present)
- Mexican Biochemistry Society (2012-2016)

## Outreach activities

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- 2019 - present **Científicas Mexicanas en el Extranjero** Member & Co-Founder. Twitter: @MexiCiencia. Website: <https://mexiciencia.github.io>
- 2020 - Poster communication "N-terminal phosphorylation of Huntingtin exon 1: liquid-liquid phase separation and aggresome formation in mammalian cells". Ciências Research Day, Faculty of Science, University of Lisbon, Portugal.
- 2017-2018 As a Project Manager at the Mexican Protein Society
  - i. 10 Schools on Protein Science in ten different states of Mexico, with 1,534 students and 43 national speakers.
  - ii. 6 Workshops on Protein Science in four different states of the country, with 292 attendees, 30 national speakers and nine international speakers.
  - iii. 2 Annual Meetings of the Mexican Protein Society with 82 attendees.
  - iv. 2 Meetings to promote links between Academy, Industry and Decision-makers with 82 attendees.

## Training and Courses

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- **Grant Writing Course** (2019) Instituto de Tecnología Química e Biológica - 18 hrs
- **Python Course** by Dr. Manuel Nuno Melo (2018) Instituto de Tecnología Química e Biológica - 16 hrs

- **Workshop on Single-molecule techniques** (2018) Institute of Biotechnology, Universidad Nacional Autonoma de Mexico, Cuernavaca, Morelos, Mexico - 30 hrs
- **Workshop on Nuclear Magnetic Resonance of Proteins** (2018) - Centro de investigación de estudios avanzados, Mexico City - 22 hrs
- **Introduction to Scientific Advice for Policy Making** (2018) - Centro de investigación de estudios avanzados, Mexico City - 18 hrs
- **Course in Molecular modelling and dynamics** by Dr. Marcelino Arciniega (2018) - Institute of Cell Physiology - Universidad Nacional Autonoma de Mexico - 48 hrs
- **Minicourse in Protein Physics** by Dr. Paolo Carloni (2017) - Cuernavaca, Mexico. - 20 hrs
- **Workshop on X-ray Scattering in Biology and Material Science'** (2017) Institute of Chemistry, Universidad Nacional Autonoma de Mexico - 8 hrs
- **Workshop on Enhanced Sampling Molecular Dynamics Simulations** (2017) Faculty of Chemistry, Universidad Nacional Autonoma de Mexico - 20 hrs
- **Course in Intellectual property rights and Entrepreneurship in Biotechnology** (2017) Institute of Biotechnology, Universidad Nacional Autonoma de Mexico, Cuernavaca, Morelos, Mexico - 8 hrs
- **3rd USA-Mexico Workshop in Biological Chemistry: Protein Folding, Dynamics and Function** (2013) Guanajuato, Mexico - 20 hrs
- **2nd USA-Mexico Workshop in Biological Chemistry: Protein Folding, Misfolding and Design** (2011) Universidad Nacional Autonoma de Mexico, Mexico.
- **Introduction to Molecular Dynamics Simulations Workshop** by Dr. Angel Pineiro (2011) - Faculty of Chemistry, Universidad Nacional Autonoma de Mexico - 16 hrs
- **International School on Macromolecules Crystallization** (2008) Cancún, México - 16 hrs

## Languages

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- Spanish - Native speaker
- English - Speaking : Advanced (C1); Reading : Advanced (C1); Writing : Advanced (C1); Listening : Advanced (C1); Peer-review: Advanced (C1)
- Portuguese - Speaking: Intermediate (B1); Reading: Upper Intermediate (B2); Writing: Elementary (A2); Listening: Intermediate (B1); Peer-review: Beginner (A1)
- Náhuatl (endangered language) - Speaking: Intermediate (B1); Reading: Upper Intermediate (B2); Writing: Elementary (A2); Listening: Intermediate (B1); Peer-review: Beginner (A1)
- Italian - Speaking: Elementary (A1); Reading: Upper Intermediate (B2); Writing: Elementary (A2); Listening: Intermediate (B1); Peer-review: Beginner (A1)
- French - Speaking: Beginner (A1); Reading: Elementary (A2); Writing: Beginner (A1); Listening: Intermediate (B1); Peer-review: Beginner (A1)

\* According to Europass Standards (<http://europass.cedefop.europa.eu/LanguageSelfAssessmentGrid/en>)