Alberto Vega Peñaloza

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Education.

Bachelor´s Degree: Pharmaceutical Chemist. Faculty of Chemistry-Pharmacobiology, Universidad Michoacana de San Nicolás de Hidalgo (UMSNH) Sept. 2001 - Aug. 2006.

PhD in Chemical Sciences. Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV-IPN). Department of Chemistry. México City. Prof. Dr. Eusebio Juaristi. Sept. 2007 - Jan 2014.

Postdoctoral Researcher. Universidad Nacional Autónoma de México (UNAM), Faculty of Chemistry. México City. Prof. Dr. Norberto Farfán García. Feb.- Nov. 2014.

Postdoctoral Researcher. Institut Català d' Investigació Química (ICIQ), Tarragona, Spain. Prof. Dr. Paolo Melchiorre. Dec. 2014 - July 2017.

Instituto de Química, UNAM-Berkeley Global Science Institute Project. 2018-present.

Publications in peer-reviewed scientific journals.

Direct Enzymatic Route for the Preparation of Novel Enantiomerically Enriched Hydroxylated β-Amino Ester Stereoisomers.
Enikő Forró, Lászlo Schönstein, Loránd Kiss, Alberto Vega-Peñaloza, Eusebio Juaristi and Ferenc Fülöp**,** *Molecules*, **2010**, 15, 3998-4010.

Stereoselective Synthesis of Chiral Pyrrolidine Derivatives of (+)-α-pinene Containing a β-Amino Acid Moiety.
Alberto Vega-Peñaloza, Omar Sánchez-Antonio, Margarita Escudero-Casao, Gabor Tásnadi, Ferenc Fülöp, and Eusebio Juaristi, *Synthesis*, **2013**, 45, 2458-2468. C

An Alternative Synthesis (*S*)-proline Derivatives Containing a Thiohydantoin Moiety and their Application as Organocatalysts in the Asymmetric Michael Addition Under Solvent-free Conditions.
Alberto Vega-Peñaloza, Omar Sánchez-Antonio, C. Gabriela Ávila-Ortiz, Margarita Escudero-Casao and Eusebio Juaristi. *Asian Journal of Organic Chemistry*, **2014**, 3, 487-496. ***Highlighted in Chemistry Views.***

Enantiopure 1,2,3-triazolyl-β-Amino Acids Via Click Cycloaddition Reaction on Racemic Alkynyl Precursor Followed by Separation of Stereoisomers.
Margarita Escudero-Casao, Alberto Vega-Peñaloza, Eusebio Juaristi. *Current topics in Medicinal Chemistry*, **2014**, 14, 1257-1270.

Use of (*R*)-Mandelic Acid as Chiral Co-Catalyst in the Michael Addition Reaction Organocatalyzed by (1*S*,4*S*)-2-Tosyl-2,5 diazabicyclo[2.2.1]heptane under Solvent-Free Conditions.
C. Gabriela Ávila-Ortiz, Manuel López-Ortiz, Alberto Vega-Peñaloza, Ignacio Regla, Eusebio Juaristi *Asymmetric Catalysis* **2015**, 2, 37–44.

Trapping Photochemically Generated Hydroxy-*o*-Quinodimethanes by Enantioselective Organocatalysis.
Luca Dell'Amico, Alberto Vega-Peñaloza, Sara Cuadros, Paolo Melchiorre *Angew.Chem. Int. Ed.* **2016**, 55, 3313–3317. ***Highlighted in Synfact 2016, 419.***

Two-photon absorption properties of four new pentacoordinated diorganotin complexes derived from Schiff bases with fluorine.
Alejandro Enríquez-Cabrera, Alberto Vega-Peñaloza, Violeta Álvarez-Venicio, Margarita Romero-Ávila, Pascal G. Lacroix, Gabriel Ramos-Ortiz, Rosa Santillan, Norberto Farfán *Journal of Organometallic Chemistry* **2018**, 855, 51-58.

Direct Stereoselective Installation of Alkyl Fragments at the β-Carbon of Enals via Excited Iminium Ion Catalysis.
C. Verrier, N. Alandini, C. Pezzetta, M. Moliterno, L. Buzzetti, H.B. Hepburn, A. Vega-Peñaloza, M. Silvi, P. Melchiorre *ACS Catal.* **2018**, 8, 1062-1066
Among the most accessed articles in January 2018
Highlighted in Synfact 2018, 14(04): 0424 DOI: 10.1055/s-0037-1609373

Invited presentations to peer-reviewed, internationally established conferences and/or international advanced schools.

- ***Visiting PhD Student***. Institute of Pharmaceutical Chemistry at the University of Szeged, Hungary, Prof. Dr. Ferenc Fülöp, Sep.-Nov. **2009**.

- ***30th Latin American Congress of Chemistry***.
  27-31, October **2012**. Cancún, Quintana Roo, México.
  Poster: **"Synthesis of peptidic compounds derived from (+)-α-pinene"**
  Gábor Tasnádi, Omar Sánchez-Antonio, Ferenc Fülöp, Eusebio Juaristi, Alberto Vega Peñaloza.

- ***246th ACS National Meeting & Exposition,***
  8-12, September **2013**. Indianapolis, IN, United States,
  Talk: **"Design and synthesis of novel chiral organocatalysts and their application in solvent-free asymmetric aldol and Michael reactions".**
  Alberto Vega-Peñaloza, Claudia G. Ávila-Ortiz, Omar Sánchez-Antonio, and Eusebio Juaristi.

- ***3rd US-Spain Symposium on Asymmetric Catalysis and Chemical Synthesis***
  26-27, May **2016**. Bilbao, País Vasco, Spain.
  Poster **"Enantioselective Organocatalytic Diels-Alder Trapping of Photochemically Generated Hydroxy-*o*-Quinidimethanes"**
  Alberto Vega-Peñaloza, Sara Cuadros, Luca Dell'Amico, Paolo Melchiorre

- ***1st Spanish-Japanese Symposium on Modern Synthetic Methodology***
  24-26 April **2017**, Gijón, Spain.
  Poster **"Enantioselective Organocatalytic Diels-Alder Trapping of Photochemically Generated Hydroxy-*o*-Quinidimethanes"**
  Alberto Vega-Peñaloza, Sara Cuadros, Luca Dell'Amico, Paolo Melchiorre

Participation at national conferences with oral/poster communications.

- **First meeting of the National Academy of Organic Chemistry (AMQO)**
  29-30 November and 1-3 December, **2004**. Apizaco, Tlaxcala, México.
  Poster: **"Obtención de Furazanos a partir de Cetonas α, β-insaturadas"**.
  Esther García Garibay, Virgilio Mendoza González, Agustín Guzmán Barriga, J. Manuel Zaragoza Ríos, Alberto Vega Peñaloza.

- **XL Mexican Congress of Chemistry of the Chemical Society of Mexico (Sociedad Química de México SQM)**
  25-29 September, **2005**. Morelia, Michoacán, México.
  Poster: **"Obtención de Furazanos a partir de Cetonas α, β-insaturadas"**.

Esther García Garibay, Virgilio Mendoza González, Agustín Guzmán Barriga, J. Manuel Zaragoza Ríos, Alberto Vega Peñaloza.

- **45th Mexican Congress of Chemistry and 29th National Congress of Chemical Education (SQM)**
  18-22 September, **2010**. Riviera Maya, Quintana Roo, México.
  Poster: **"Síntesis de β-Amino-Amidas quirales derivadas del (+) y (-)-α-Pineno"**.
  Gábor Tasnádi, Fernando González Fernández, Ferenc Fülöp, Eusebio Juaristi, Alberto Vega Peñaloza.

- **5th Colloquium of Organic Chemistry and Molecular Design**
  Instituto de Investigaciones Químico Biológicas. Universidad Michoacana de San Nicolás de Hidalgo,
  2013. Morelia, Michoacán, México.
  Talk: **"Design and synthesis of novel chiral organocatalysts and their application in solvent-free asymmetric aldol and Michael reactions".**
  Alberto Vega-Peñaloza, Eusebio Juaristi.

- XIV Reunión de la Academia Mexicana de Química Orgánica (AMQO).
  22-23 Marzo **2018**, Mérida, Yucatán, México.
  Poster **"Enantioselective Organocatalytic Diels-Alder Trapping of Photochemically Generated Hydroxy-*o*-Quinidimethanes"**
  Alberto Vega-Peñaloza, Sara Cuadros, Luca Dell'Amico, Paolo Melchiorre.

- **Seminar.** 27 April **2018**. Facultad de Química, UNAM.
  Talk: "**Organocatálisis como herramienta en fotoquímica: captura enantioselectiva de radicales e intermediarios de difícil acceso**"
  Alberto Vega Peñaloza.

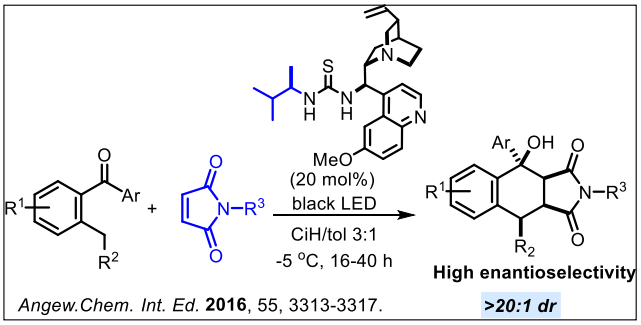
- **Seminar.** 3 May **2018**. Departamento de Química, CINVESTAV-IPN.
  Talk: "**Organocatálisis como herramienta en fotoquímica: captura enantioselectiva de radicales e intermediarios de difícil acceso**"
  Alberto Vega Peñaloza.

Prizes and Awards.

- *Padre de la Patria* Award in **2006** for academic excellence by the UMSNH (Universidad Michoacana de San Nicolás de Hidalgo)
- Recognition for obtaining the *best academic average* of the fifth year during the **2005-2006** school year by the Faculty of Chemistry-Pharmacybiology (UMSNH).
- *PhD thesis finalist* in the national prize of the Mexican Chemical Society (*Sociedad Mexicana de Química*) to the best thesis in the year **2014**.
- Appointment as member of the Mexican National System of Researchers (SNI) Level I from **2017**.

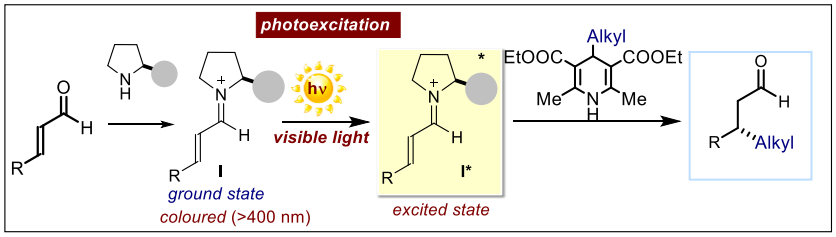
Summary of postdoctoral research activities in the ICIQ. In November 2014, I was awarded by CONACyT with a grant for a postdoctoral stay abroad, so in December of that year I joined the research group of Prof. Paolo Melchiorre at ICIQ (*Institut Català d' Investigació Química*). The Melchiorre group is a world frontrunner in the research into the development of novel organocatalytic enantioselective methods. In this research period, I worked on high-level frontier research projects: the use of organocatalysis as tool in photochemistry for the development of new enantioselective reactions. In the first project, *we described the first catalytic and enantioselective photoenolization-Diels Alder process for the synthesis of chiral benzannulated carbocyclic products,* an important contribution to the field of organocatalysis (*Angew.Chem. Int. Ed.* **2016**, 55, 3313–3317. *Highlighted in Synfact 2016, 419*)**.** We addressed this longstanding and elusive problem, using readily available chiral organic catalysts that can activate distinct dienophiles

toward the stereoselective interception of the fleeting hydroxy-*o*-quinodimethanes. A chiral organic catalyst, derived from natural cinchona alkaloids, activates maleimides toward highly stereoselective Diels-Alder reactions, while a chiral secondary amine catalyses an unconventional conjugate addition of the photoenol to α,β-unsaturated aldehydes, leading to enantioenriched chiral β-benzylated aldehydes. Our investigations indicate that an unconventional yet uniform mechanism of stereocontrol is operative, wherein the organocatalysts are actively involved in both the photochemical pathway, by leveraging the formation of the reactive hydroxy-*o*-quinodinomethane, and the stereoselectivity-defining event. We believe that this new catalytic blueprint will find application in other enantioselective catalytic photenol-trapping processes (Scheme 1).



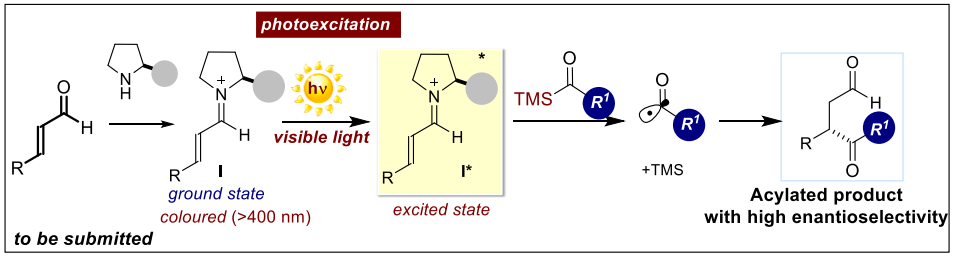
Scheme 1.

During my second year as postdoctoral researcher at Melchiorre group, *we developed catalytic systems for the enantioselective capture of alkyl and acyl radicals* translating the effective tools governing the success of ground state asymmetric organocatalysis into the realm of photochemical reactivity, exploiting the potential of key organocatalytic intermediates to directly participate in the photoexcitation of substrates. We have reported a method for the direct region and stereoselective installation of alkyl fragments at the β position of α,β-unsaturated aldehydes. The chemistry relies on the visible light excitation of chiral iminium ions, which turns them into strong oxidants able to generate C(sp3)-centered radicals from readily available 4-alkyl-1,4-dihydropyridines (Scheme 2). *ACS Catal.* **2018**, 8, 1062-1066.



Scheme 2.

Under this same methodology, *we are developing the first catalytic system for enantioselective capture of acyl radical.* The results of these final investigations will be reflected in short-term publications (Scheme 3).



Scheme 3.