

*Curriculum Vitae*

**JUAN FRANCISCO LEÓN**

**Assistant Professor**

Department of Drug Discovery and  
Biomedical Sciences  
College of Pharmacy  
University of South Carolina  
541 Main St, room 112A  
Columbia, SC 29208  
USA

Phone: (803) 576 6082

Fax: (803) 777 2775

E-mail: [jleon@mailbox.sc.edu](mailto:jleon@mailbox.sc.edu)

**EDUCATION:**

<b>Chemist</b> National University of Colombia Bogotá, Colombia	1991-1998
<b>DEA Organic Chemistry</b> La Laguna University San Cristóbal de La Laguna, Tenerife, Spain	1999-2001
<b>Ph.D. Organic Chemistry</b> La Laguna University San Cristóbal de La Laguna, Tenerife, Spain	2001-2005

**PREVIOUS EMPLOYMENT:**

<b>Research Assistant Professor</b> , Department of Medicinal Chemistry, College of Pharmacy, University of Florida	05/2019-08/2020
<b>Assistant scientist</b> , Department of Medicinal Chemistry, College of Pharmacy, University of Florida	07/2017-04/2019
<b>Research Scientist</b> , Department of BioMolecular Sciences, Divisions of Medicinal Chemistry and Pharmacognosy, School of Pharmacy, University of Mississippi, University, MS, USA.	02/2013- 06/2017
<b>Researcher</b> , Natural Products and Agrobiolgy Institute, Spanish National Research Council, La Laguna, Spain.	08/2009-01/2013
<b>Associate Research Scientist/postdoctoral scientist</b> , Medicinal Chemistry Department, School of Pharmacy, University of Mississippi, University, MS, USA.	05/2007- 07/2009
<b>Postdoctoral Research</b> , Polytechnic School, European University of Madrid, Madrid, Spain.	01/2007-05/2007
<b>Postdoctoral Research Assistant</b> , Canary Islands Cancer Research Institute, Santa Cruz de Tenerife, Spain.	08/2005-12/2006
<b>Research Fellow</b> , Canary Islands Cancer Research Institute, Santa Cruz de Tenerife, Spain.	01/2003-07/2005

<b>Research Fellow</b> , Inversiones Tecnológicas y de Ocio S.L., Cuenca, Spain.	06/2003-09/2003
<b>Research Fellow</b> , University of La Laguna, La Laguna, Spain.	01/2002-12/2002
<b>Research Fellow</b> , Natural Products and Agrobiology Institute, Spanish National Research Council, La Laguna, Spain.	02/2000-12/2001
<b>Research Assistant</b> , Independent Board of Museums and Centers, Council of Tenerife (Cabildo de Tenerife), Santa Cruz de Tenerife, Spain.	01/1999-12/1999
<b>Research Assistant</b> , Institute of Immunology (San Juan de Dios, Hospital), Bogotá, Colombia.	03/1998-10/1998

### **AWARDS AND HONORS:**

Fellowship, National University of Colombia,	1993-1997
Scholarship- Agency for Research and Innovation (Agencia Canaria de Investigación) funded by the Canary Island Government.	06/2010 to 08/2010
Dean's Excellence Awards for Research, and Service, College of Pharmacy, University of South Carolina	2021
Emerging Research Award, College of Pharmacy, University of South Carolina	2023

### **PROFESSIONAL ORGANIZATIONS:**

Member, Phytochemical Society of Europe	2003-2005
Member, Faculty Row	2015-2018
Member, American Association for the Advancement of Science	2014-
Member, American Chemical Society	2016-
Member, American Association of Pharmaceutical Scientists	2016-
Member, American Association of Colleges of Pharmacy	2020-
Member, American Society of Pharmacognosy	2020-
Member Rho Chi Society	2024-

### **RESEARCH SUPPORT:**

#### ***Ongoing Research Support***

Source of Support:	The National Institutes of Health – National Institute of General Medical Sciences (NIH-NIGMS) - as one of its Centers of Biomedical Research Excellence (COBRE)
Grant Number:	Grants-P20 GM109091, Center for Targeted Therapeutics CTT-COBRE, (Targeted grant)

Grant Title: *Synthesis of cannabidiol dimers as potential agents to treat neurological disorders*

Principal Investigator: Juan Francisco León, University of South Carolina

Project Period: 11/08/2022 – 04/30/2025

Role on Project: Principal Investigator

Amount: \$ 447,000

Overall Objective: We aim to investigate the natural products cannabidiol and its derivatives (dimers) and their ability to modulate 5-HT<sub>1A</sub>, CB<sub>1</sub> and CB<sub>2</sub> receptors aiming new agents to treat depression and anxiety.

### **Previous Research Grants**

Source of Support: Office of the Vice President for Research, University of South Carolina

Grant Number: ASPIRE I, Junior Faculty Development

Grant Title: Selective Monoamine Oxidase Inhibitors in the Treatment of Parkinson's Disease and Other Neurological Disorders

Principal Investigator: Juan Francisco León,

Project Period: 07/01/2022 – 03/31/2024

Role on Project: Principal Investigator

Amount: \$ 15,000

Overall Objective: We aim to investigate the synthesis of analogs of the dietary flavonoid acacetin and the evaluation as monoamine oxidase inhibitors.

Source of Support: The National Institutes of Health – National Institute of Drug Abuse NIDA

Grant Number: 1 UG3 DA048353 01

Grant Title: Opioids use disorders: UF pharmacy discovery and development.

Principal Investigator: Lance McMahon and Christopher R. McCurdy Ph. D; University of Florida

Project Period: 12/15/2018-12/15/2020

Role on Project: Key Personal

Amount: \$ 3,526,803

Overall Objective: Recent investigations into mitragynine, the major alkaloid found in *Mitragyna speciosa* (Kratom), have identified a novel approach to new therapeutic mechanisms that have not been previously explored. This involves the combination of G-protein biased  $\mu$ - opioid receptor and  $\alpha$ -2 adrenergic receptor activation. Our studies indicate that mitragynine does not exhibit abuse-related effects and can attenuate opioid intake. This application seeks to identify analogs and prodrugs of mitragynine that have drug-like properties as potential innovative treatments for opioid use disorder.

Source of Support: The National Institutes of Health – National Institute of Drug Abuse NIDA

Grant Number: 1R01DA047855-01A1

Grant Title: Kratom alkaloids in vitro and in vivo pharmacological mechanism.

Principal Investigator: Lance McMahon and Christopher R. McCurdy Ph. D; University of Florida

Project Period: 4/15/2019-2/29/2024

Role on Project: Co-I

Amount: \$ 2,526,803

Overall Objective: *Mitragyna speciosa* (kratom) has exploded onto the US market, with an estimated 55,000 kg entering the US between 2014 and 2016, corresponding to 12 million kratom doses and one million users. The FDA recently used computational modeling to predict that 22 kratom constituents bind to opioid receptors; however, these predictions await translation into whole animals. There is an urgent need for systematic, pharmacological testing of kratom alkaloids to help inform abuse risk. We feel it is important to assess the behavioral effects of not only individual alkaloids, but also alkaloid mixtures representative of plant material in commercially used products. We will extract, isolate, and purify alkaloids from two kratom sources: dried leaf material of *Mitragyna speciosa* trees and a US commercial product.

Source of Support: USAID/US-Egypt Joint Board on Scientific and Technological Cooperation.

Grant Number: 082013 (DAA-15-61222-1)

Grant Title: *Isolation and Biological Evaluation of Opioid Receptor Modulators from Asteraceae Plants Growing in Egypt*

Principal Investigator: McCurdy, Christopher Ph. D; University of Florida

Project Period: 08/01/2015-06/30/2018

Role on Project: Contributor-Research Scientist

Amount: \$ 156,846

Overall Objective: Several Asteraceae plant extracts were recently reported to possess opioid-like properties. The aim of this research project is to isolate novel compounds from Asteraceae plants and evaluate them in cannabinoid and opioid assays. Discovery of an opioid modulator with improved pharmacological profile could represent a new hope for the management of pain and/or drug abuse and would have a great socioeconomical impact on both countries.

Source of Support: West Virginia (West Liberty University) IDeA Network of Biomedical Research Excellence (WV-INBRE) for Biomedical Research Applications (The National Institutes of Health – National Institute of General Medical Sciences)

Grant Number: Grants-P20 GM103434, NIH-WV-INBRE

Grant Title: *Investigation of aloe emodin and other novel antibiotics from natural products*

Principal Investigator: Joseph Horzempa, University of West Liberty

Project Period: 11/15/2016 – 07/31/2017  
Role on Project: Co-Principal Investigator  
Amount: \$ 42,150  
Overall Objective: We aim to investigate natural products that we have already demonstrated to have antimicrobial activity against *Staphylococcus aureus*. We isolated aloe emodin as a bioactive component; our main focus is to synthesized derivatives to improve the pharmacological profile. We also will be investigated for the ability to reduce the intracellular growth of *Francisella tularensis* LVS through immune activation.

Source of Support: The National Institutes of Health – National Institute of General Medical Sciences (NIH-NIGMS) - as one of its Centers of Biomedical Research Excellence (COBRE)

Grant Number: 4P20GM104932-10, NIH-NIGMS

Grant Title: *The Center for Research Excellence in Natural Products Neuroscience (CORE-NPN)*

Principal Investigator: Majumdar, Soumyajit Ph. D; University of Mississippi

Project Period: 09/04/2006-08/31/2017

Role on Project: Contributor-Research Scientist

Amount: \$ 2,063,370

Overall Objective: Research at the Department of BioMolecular Science at the School of Pharmacy. It is at the interphase of neuroscience and natural products on developing a multidisciplinary research center to study properties of natural products to discover new drugs for unmet therapeutic needs. Neuroscience is an area that is recognized as an important growth area.

Source of Support: West Virginia IDeA Network of Biomedical Research Excellence (WV-INBRE) for Biomedical Research Applications (The National Institutes of Health – National Institute of General Medical Sciences)

Grant Number: Grants- P20 GM103434, NIH-WV-INBRE

Grant Title: *Characterization and Discovery of Novel Antibiotics from Natural Products*

Principal Investigator: Joseph Horzempa, University of West Liberty

Project Period: 2015/08/01-2016/07/31

Role on Project: Co-Principal Investigator

Amount: \$ 42,150

Overall Objective: We aim to investigate natural products that we have already demonstrated to have antimicrobial activity against *Staphylococcus aureus*. We first want to determine if these recently identified plant and fungal extracts have broad-spectrum antimicrobial activity against a variety of pathogenic bacteria. And also, will be investigated for the ability to reduce the intracellular growth of *Francisella tularensis* LVS through immune activation.

Source of Support: Ministry of Foreign Affairs and Cooperation (Ministerio de Asuntos Exteriores y de Cooperación), PCI-Program, Spain

Grant Number: PCI (A1/035449/11)

Grant Title: *Actions for the Development and Training of Researchers and Teachers in the Study of Plants and Fungi Used in Traditional Medicine in Algeria*

Principal Investigator: Dr. Juan Francisco León; Spanish National Research Council

Project Period: 12/2011 – 12/2012

Role on Project: Principal Investigator

Amount: € 35,700

Overall Objective: The study of plant species and fungi in northern Africa and the Canary Islands. These results produce knowledge for their (Africa-Country) development; in turn the possibilities of pharmacological applications of the extract or isolated molecules were explored.

## **PUBLICATIONS:**

see also at: <https://www.ncbi.nlm.nih.gov/myncbi/juan.leon.2/bibliography/public/>

### *Peer-Reviewed Publications (Science Citation Index; Journals)*

1. Lanostanoids Triterpenes from *Ganoderma lucidum*. González, A. G.; **León, F.**; Rivera, A.; Muñoz, C. M.; Bermejo J. *Journal of Natural Products* 62, 1700-1701, **1999**. DOI: 10.1021/np990295y.
2. Synthesis of 2*t*-Substituted-1*r*,3*c*-bis(2'-hydroxy-5'-substituted-benzyl)-imidazolidines by Reaction of 1,3-bis(2'-Hydroxy-5'-substituted-benzyl)-imidazolidines with Aromatic Aldehydes. Rivera, A.; **León, F.**; Rivera, J.; Parra, E. C.; Purmova, J.; Burgueño-Tapia, E.; Joseph-Nathan, P. *Synthetic Communications* 30, 2029-2040, **2000**. DOI: 10.1080/00397910008087252
3. Phenolic Compounds of Dragon's Blood from *Dracaena draco*. González, A. G.; **León, F.**; Sánchez-Pinto, L.; Padrón, J. I.; Bermejo, J. *Journal of Natural Products* 63, 1297-1299, **2000**. PMID: 11000044; DOI: 10.1021/np000085h
4. A Facile Chemoselective Deacetylation in the Presence of Benzoyl and *p*-Bromobenzoyl using *p*-Toluensulfonic Acid. González, A. G.; Brouard, I.; **León, F.**; Padrón, J. I.; Bermejo, J. *Tetrahedron Letters* 42, 3187-3188, **2001**. DOI: 10.1016/S0040-4039(01)00406-3
5. New Lanostanoids from *Ganoderma concinna*. González, A. G.; **León, F.**; Rivera, A.; Padrón, J. I.; González-Platas, J.; Zuluaga, J.; Quintana, J.; Estévez, F.; Bermejo, J. *Journal of Natural Products* 65, 417-421, **2002**. PMID: 11908995; DOI: 10.1021/np010143e
6. Antiproliferative Activity of a New Compound Containing an  $\alpha$ -Methylene-  $\gamma$ -Lactone Group. González, A. G.; Hernandez, M.; Padrón, J. I.; **León, F.**; Reyes, E.; Álvarez-Mon, M.; Pivel, J. P.; Quintana, J.; Estévez, F.; Bermejo, J. *Journal of Medicinal Chemistry* 45, 2358-2361, **2002**. PMID: 12036345; DOI: 10.1021/jm025518n
7. Steroidal Saponins from the Bark of *Dracaena draco* and their Cytotoxic Activities. González, A. G.; Hernández, J. C.; **León, F.**; Padrón, J. I.; Estévez, F.; Quintana, J.;

- Bermejo, J. *Journal of Natural Products* 66, 793-798, **2003**. PMID: 12828464; DOI: 10.1021/np020517j
8. Sesquiterpenoids Derivatives from *Gonospermum elegans* and their Cytostatic Activity on HL-60 Human Promyelocytic Cells. Triana, J.; López, M.; Rico, M.; González-Platas, J.; Quintana, J.; Estévez, F.; **León, F.**; González, A. G.; Bermejo, J. *Journal of Natural Products* 66, 943-948, **2003**. PMID: 12880311; DOI: 10.1021/np020390y
  9. Novel Cytostatic Lanostanoid Triterpenes from *Ganoderma australe*. **León, F.**; Valencia, M.; Rivera, A.; Nieto, I.; Quintana, J.; Estévez, F.; Bermejo, J. *Helvetica Chimica Acta* 86, 3088-3095, **2003**. DOI:10.1002/hlca.200390251
  10. Flavans of Dragon's Blood from *Dracaena draco* and *Dracaena tamarenae*. González, A. G.; **León, F.**; Hernández, J. C.; Padrón, J. I.; Sánchez-Pinto, L.; Bermejo, J. *Biochemical Systematic & Ecology* 32, 179-184, **2004**. DOI: 10.1016/S0305-1978(03)00133-9
  11. Isolation of a New Kaempferol Derivative from *Eucalyptus occidentalis* that Induces Apoptosis in Human Myeloid Leukemia Cells. Benyahia, S.; Benayache, S.; Benayache, F.; Quintana, J.; López, M.; **León, F.**; Hernández, J. C.; Estévez, F.; Bermejo, J. *Journal of Natural Products* 67, 527-531, **2004**. PMID: 15104478; DOI: 10.1021/np049960f
  12. Icogenin, a New Cytotoxic Steroidal Saponin Isolated from *Dracaena draco*. Hernández, J. C.; **León, F.**; Quintana, J.; Estévez, F.; Bermejo, J. *Bioorganic Medicinal Chemistry* 12, 4423-4429, **2004**. PMID: 15265493; DOI: 10.1016/j.bmc.2004.06.009
  13. Lanostanoids Triterpenes from *Laetiporus sulphureus* and Apoptosis Induction on HL-60 Human Myeloid Leukemia Cells. **León, F.**; Quintana, J.; Rivera, A.; Estévez, F.; Bermejo, J. *Journal of Natural Products* 67, 2008-2011, **2004**. PMID: 15620242; DOI: 10.1021/np049762o
  14. Cladocalol, a Pentacyclic 28-Nor-triterpene from *Eucalyptus cladocalyx* with Cytotoxic Activity. Benyahia, S.; Benayache, S.; Benayache, F.; **León, F.**; Quintana, J.; López, M.; Hernández, J. C.; Estévez, F.; Bermejo, J. *Phytochemistry* 66, 627-632, **2005**. PMID: 15771880; DOI: 10.1016/j.phytochem.2004.12.018
  15. New Sesquiterpenoids from *Pulicaria canariensis* and their Cytotoxic Activities. Triana, J.; López, M.; Pérez, F. J.; González-Platas, J.; Quintana, J.; Estévez, F.; **León, F.**; Bermejo, J. *Journal of Natural Products* 68, 523-531, **2005**. PMID: 15844941; DOI: 10.1021/np0496183
  16. A New Guianolide and other Sesquiterpene Lactones from *Centaurea acaulis* L. (Asteraceae). Ali Bentamène, Samir Benayache, Joel Crèche, Geneviève Petit, Jaime Bermejo-Barrera, **Francisco León**, Fadila Benayache. *Biochemical Systematic & Ecology* 33, 1061-1065, **2005**. DOI: 10.1016/j.bse.2005.03.009
  17. A Homoisoflavonoid and a Cytotoxic Saponin from *Dracaena draco*. Juan C. Hernández, **Francisco León**, Francisco Estévez, José Quintana, Jaime Bermejo. *Chemistry & Biodiversity* 3, 62-68, **2006**. PMID: 17193217; DOI: 10.1002/cbdv.200690008
  18. Synthesis and Antiproliferative Activity of Novel Sugiol  $\beta$ -Amino Alcohol Analogs. I. Córdova, L.G. León, **F. León**, L. San Andrés, J.G. Luis, J.M. Padrón. *European Journal of Medicinal Chemistry* 41, 1327-1332, **2006**. PMID: 16828933; DOI: 10.1016/j.ejmech.2006.06.001
  19. Revisiting the Reaction between Diaminomaleonitrile and Aromatic Aldehydes: a Green Chemistry Approach. Augusto Rivera, Jaime Ríos-Motta, **Francisco León**. *Molecules* 11, 858-866, **2006**. PMID: 18007392; DOI: 10.3390/11110858

20. Isolation, Structure Elucidation, Total Synthesis, and Evaluation of New Natural and Synthetic Ceramides on Human SK-MEL-1 Melanoma Cells. **Francisco Leon**, Ignacio Brouard, Augusto Rivera, Fernando Torres, Sara Rubio, Jose Quintana, Francisco Estevez, Jaime Bermejo. *Journal of Medicinal Chemistry* 49, 5830-5839, **2006**. PMID: 16970407; DOI: 10.1021/jm0605334
21. Terpenoids and Triynepoxide from the Aerial Part of *Rhantherium adpressum*. M. Bouheroum, S. Benayache, F. Benayache, L. Zaiter, J. M. Barrera, **Francisco Leon**. *Chemistry of Natural Compounds* 43, 110-111, **2007**. DOI: 10.1007/s10600-007-0046-9
22. Sesquiterpene Lactones and other Constituents from *Matricaria chamomilla* L. Lahcene Zaiter, Mohamed Bouheroum, Samir Benayache, Fadila Benayache, **Francisco Leon**, Ignacio Brouard, Jose Quintana, Francisco Estevez, Jaime Bermejo. *Biochemical Systematic & Ecology* 35, 533-538, **2007**. DOI: 10.1016/j.bse.2007.03.008
23. A New Ceramide from *Suillus luteus* and Its Cytotoxic Activity against Human Melanoma Cells. **Francisco León**, Ignacio Brouard, Fernando Torres, José Quintana, Augusto Rivera, Francisco Estévez, Jaime Bermejo. *Chemistry & Biodiversity* 5, 120-125, **2008**. PMID: 18205114; DOI: 10.1002/cbdv.200890002
24. A New Guaianolide and other Constituents from *Achillea ligustica*. Azzedine Boudjerda, Hanene Zater, Samir Benayache, Jean-Claude Chalchat, Javier Gonzalez-Platas, **Francisco Leon**, Ignacio Brouard, Jaime Bermejo, Fadila Benayache. *Biochemical Systematic & Ecology* 36, 461-466, **2008**. DOI: 10.1016/j.bse.2007.11.006
25. Synthesis of Novel Spirostanic Saponins and Their Cytotoxic Activity. Juan C. Hernández, **Francisco León**, Ignacio Brouard, Fernando Torres, Sara Rubio, José Quintana, Francisco Estévez, Jaime Bermejo. *Bioorganic Medicinal Chemistry* 16, 2063-2076, **2008**. PMID: 18023191; DOI: 10.1016/j.bmc.2007.10.089
26. Induction of G<sub>2</sub>-M Phase Arrest and Apoptosis by  $\alpha$ -Methylene- $\gamma$ -butyrolactones in Human Leukemia Cells. Fernando Torres, José Quintana, Javier Cabrera, Juan F Loro, **Francisco León**, Jaime Bermejo, Francisco Estévez. *Cancer Letters* 269, 139-147, **2008**. PMID: 18514396; DOI: 10.1016/j.canlet.2008.04.028
27. Mycophenolic Derivatives from *Eupenicillium parvum*. Eman Habib, **Francisco León**, John Bauer, Robert A. Hill, Paulo Carvalho, Horace G. Cutler, Stephen J. Cutler. *Journal of Natural Products* 71, 1915-1918, **2008**. PMID: 18991460; PMCID: PMC2646755; DOI: 10.1021/np8003497
28. Sesquiterpene Lactones from *Gonospermum gomeræ* and *G. fruticosum* and Their Cytotoxic Activities. Jorge Triana, Jose Luis Eiroa, Juan Jose Ortega, **Francisco Leon**, Ignacio Brouard, Fernando Torres, José Quintana, Francisco Estévez, Jaime Bermejo. *Journal of Natural Products* 71, 2015-2020, **2008**. PMID: 19053514; DOI: 10.1021/np800474v
29. Chemical Constituents of *Tolpis* Species. Jorge Triana, Mariana López, Francisco Javier Pérez, Javier González Platas, Francisco Estévez, **Francisco León**, Juan Carlos Hernández, Ignacio Brouard, Jaime Bermejo. *Fitoterapia* 80, 437-441, **2009**. PMID: 19524645; DOI: 10.1016/j.fitote.2009.06.001
30. Phytochemical Characterization of the Leaves of *Mitragyna speciosa* Grown in USA. **Francisco León**, Eman Habib, Jessica Adkins, Edward Furr, Christopher McCurdy, Stephen Cutler. *Natural Products Communication* 4, 907-910, **2009**. PMID: 19731590



31. A Flavonoid with Cytotoxic Activity and other Constituents from *Centaurea africana*. Ramdane Seghiri, Ouahiba Boumaza, Ratiba Mekkiou, Samir Benayache, Paul Mosset, José Quintana, Francisco Estévez, **Francisco León**, Jaime Bermejo, Fadila Benayache. *Phytochemistry Letters* 2, 114-118, **2009**. DOI: 10.1016/j.phytol.2009.03.002
32. Four Flavonoids from the Aerial Part of *Ononis angustissima* species. M. Bouheroum, L. Zaiter, S. Benayache, F. Benayache, J. Bermejo, **F. León**, V. García. *Chemistry of Natural Compounds* 45, 874-875, **2009**. DOI: 10.1007/s10600-010-9482-z
33. Chemotaxonomy of *Gonospermum* and Related Genera. Jorge triana, José Luis Eiroa, Juan José Ortega, **Francisco León**, Ignacio Brouard, Juan C. Hernández, Francisco Estévez, Jaime Bermejo. *Phytochemistry* 71, 627-634, **2010**. PMID: 20096903; DOI: 10.1016/j.phytochem.2009.12.013
34. Flavonoids Aglycones from *Centaurea maroccana*. S. Bicha, A. Bentamene, O. Benaissa, S. Benayache, V.P. Garcia, **F. León**, I. Brouard, J. Bermejo, F. Benayache. *Chemistry of Natural Compounds* 47, 105-106, **2011**. DOI: 10.1007/s10600-011-9843-2
35. Flavonoids Aglycones and Sterol from *Chrysanthemum fontanesii*. O. Benaissa, A. Bentamene, S. Bicha, F. Benayache, I Brouard, V.P. García, **F. León**, J. Bermejo, S. Benayache. *Chemistry of Natural Compounds* 47, 107-108, **2011**. DOI: 10.1007/s10600-011-9844-1
36. Lignans and an Abundant Flavone Glycoside with Free-Radical Scavenging Activity from the Roots of the Endemic Species *Stachys mialhesi* de Noé. Souheila Laggoune, Ignacio Brouard, **Francisco León**, Claude-Alain Calliste, Jean-luc Duroux, Jaime Bermejo, Zahia Kabouche, Ahmed Kabouche. *Records of Natural Products* 5, 238-241, **2011**.
37. New Labdane Diterpene and other Constituents from *Marrubium deserti* Noe ex Coss. Dendougi H., Seghir S., Belloum Z., Benayache F., **León F.**, Brouard I., Bermejo J., Benayache S. *Records of Natural Products* 5, 300-304, **2011**.
38. Benzyl Derivatives with in Vitro Binding Affinity for Human Opioid Receptors and Cannabinoid Receptors from the Fungus *Eurotium repens*. Jiangtao Gao, **Francisco León**, Mohamed M. Radwan, Olivia R. Dale, Corey A. Gemelli, Susan P. Manly, Shari Lupien, Xiaoning Wang, Robert A. Hill, Frank M. Dugan, Horace G. Cutler, Stephen J. Cutler. *Journal of Natural Products* 74, 1636-1639, **2011**. PMID: 21667972; PMCID: PMC3142309; DOI: 10.1021/np200147c
39. Secondary Metabolites from Two Species of *Pulicaria* and their Cytotoxic Activity. Triana Jorge, López, Mariana, Pérez, Francisco Javier, **León, Francisco**, Quintana, José, Estévez, Francisco, Hernández, Juan Carlos, González-Platas, Javier, Brouard, Ignacio, Bermejo, Jaime. *Chemistry & Biodiversity* 8, 2080-2089, **2011**. PMID: 22083919; DOI: 10.1002/cbdv.201000324
40. Antifungal Metabolites from Roots of *Diospyros virginiana* by Overpressure Layer Chromatography. Xiaoning Wang, Eman Habib, **Francisco León**, Mohamed M. Radwan, Nurhayat Tabanca, Jiangtao Gao, Stephen J. Cutler, David E. Wedge. *Chemistry & Biodiversity* 8, 2331-2340, **2011**. PMID: 22162171; PMCID: PMC3409591; DOI: 10.1002/cbdv.201000310
41. Flavonoids and other Constituents from *Centaurea nicaeensis* All. Var *Walliana* M. Hammoud L., Seghiri, R., Benayache S., Mosset P., Lobstein A., Chaabi M., **León F.**, Brouard I., Bermejo J., Benayache F. *Natural Products Research* 26, 203-208, **2012**. PMID: 21815723; DOI: 10.1080/14786419.2010.534995

42. Phytochemical Study of *Halimium halimifolium*. L. Zaiter, M. Bouheroum, L. Hammoud, D. Sarri, S. Benayache, **F. León**, I. Brouard, J. Bermejo, and F. Benayache. *Chemistry of Natural Compounds* 47, 1023-1024, **2012**. DOI: 10.1007/s10600-012-0136-1
43. Cytotoxic Sesquiterpene Lactones and other Constituents of *Centaurea omphalotricha*. El Hadj Kolli, **Francisco León**, Fadila Benayache, Sara Estévez, José Quintana, Francisco Estévez, Ignacio Brouard, Jaime Bermejo, Samir Benayache. *Journal of Brazilian Chemical Society* 23, 977-983, **2012**. DOI: 10.1590/S0103-50532012000500026
44. Antimicrobial and Antiprotozoal Activities of Secondary Metabolites from the Fungus *Eurotium repens*. Jiangtao Gao, Mohamed M. Radwan, **Francisco León**, Melissa R. Jacob, Babu L. Tekwani, Shabana I. Khan, Shari Lupien, Xiaoning Wang, Robert A. Hill, Frank M. Dugan, Horace G. Cutler, Stephen J. Cutler. *Medicinal Chemistry Research* 21, 3080-3086, **2012**. PMID: 23024574; PMCID: PMC3457657; DOI: 10.1007/s00044-011-9798-7
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2. Phytochemistry of *Mitragyna speciosa*. Vedanjali Gogineni, **Francisco León**, Bonnie A. Avery, Christopher McCurdy, and Stephen J. Cutler. in "Kratom and Other Mitragynines: The Chemistry and Pharmacology of Opioids from a Non-Opium Source" (ISBN 9781482225181). Robert Raffa (Ed). CRC press. New York, **2014**. Pp 77-94.
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#### Patents

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*Abstracts of Congress/Meeting/Symposiums from around 200 abstracts dating back 2000, Since 2013.*

1. Vedanjali Gogineni, **Francisco León**, Lisa Wilson, Bonnie A. Avery, Christopher R. Mc Curdy, Stephen J. Cutler. *Mitragyna speciosa*: Isolation and Pharmacological Evaluation of the Indole Alkaloids. Poster presentation in MALTO 2013, University of Arkansas of Medical Sciences, Little Rock, Arkansas. May 27, 2013.
2. Smelser, A. Kumarihamy, M. **León, F.** Hill, C. Cutler, S. J. Pettaway, S. Muhammad, I. Chemical and Biological Investigation of *Atriplex canescens* for Human Opioid and Cannabinoid Receptor Binding Affinity. Presentation by Summer Undergraduate COBRE Research Interns, 2066 TCRC, University of Mississippi, July 26, 2013.
3. Hill, C. Smelser, A. **León, F.** Kumarihamy, M. Pettaway, S. Muhammad, I. Cutler. S. J. Isolation and Comparison of Active *Nelumbo nucifera* Constituents among Different Flowers for the Study of Opioid-like effects. Presentation by Summer Undergraduate COBRE Research Interns, 2066 TCRC, University of Mississippi, July 26, 2013.
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5. Pere Ferriol, Francisco J. Toledo, **Francisco León**, Ignacio Brouard, Rayco Guedes, Jose J. Santana. Heterocycles and Ceramides from *Myxilla sp.* Poster presentation in XIV International Symposium on Marine Products (MaNaPro-2013), La Toja, Galicia, Spain, Sept 15, 2013.
6. Pere Ferriol, Francisco J. Toledo, **Francisco León**, Ignacio Brouard, Christian C. Toledo. Marine Natural Products from Sponges: Sterol into *Myxilla sp.* Poster presentation in XIV International Symposium on Marine Products (MaNaPro-2013), La Toja, Galicia, Spain, Sept 15, 2013.
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9. Benayache Samir, Meriem Aissaoui, **Francisco León**, Ignacio Brouard, Fadila Benayache. Three New Phenolic Rhamnoside Compounds and a New Spermidine Alkaloid from *Reseda alphonisii* (Coss) Mull Arg. Poster presentation in 5<sup>th</sup> International Chemistry Conference, Abha, Saudi Arabia, April 26, 2014.
10. Vedanjali Gogineni, John C. Fitzpatrick, **Francisco León**, Stephen J. Cutler. Radioligand Displacement of Ayahuasca Leaves Towards Opioids and Cannabinoid Receptors. Poster presentation in MALTO-2014, The University of Tennessee Health Science Center, Memphis, TN, May 18, 2014.
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14. Daniel Zhu, Mallika Kumarihamy, Sara Pettaway, **Francisco León**, Janet Lambert, Stephen J. Cutler, Ilias Muhammad. Human Cannabinoid and Opioid Receptor Inhibitory Activities of *Eschscholtzia californica* (California poppy). Presentation by Summer Undergraduate COBRE Research Interns, 2066 TCRC, University of Mississippi, July 24, 2014.
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18. Eiroa, J.L.; Triana, J.; Perez, F. J.; Castillo, Q. A.; **León, F.**; Brouard, I. Quimiotaxonomía del Género *Gonospermum*. Poster presentation, XVIII Semana Científica "Antonio González" Universidad de La Laguna, Tenerife, Spain, Oct 8-10, 2014.
19. Gogineni V; Chaurasiya ND; **León F**; Nunez MJ; Walker LA; Tekwani BL; Cutler SJ. Identification and evaluation of potent inhibitor of human monoamine oxidase B from *Calea urticifolia*. Podium presentation in MALTO-2015, University of Mississippi, University, MS, USA May 17-19, 2015.
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33. **León F**, Gao J, Tarawneh A, Pettaway S, Lambert J, Cutler SJ. Secondary metabolites with in vitro binding affinity for human opioid and cannabinoid receptors. Poster. NIH, NIGMS Sixth Biennial National IDeA Symposium of Biomedical Research Excellence (NISBRE). Washington D.C. June 26-28, 2016.
34. Collins E, Schmitt D, Sikorsky K, Sako A, **León F**, Jacobs MR, Horzempa J. The identification of novel natural compounds that limit bacterial infection through immunostimulation. Poster. 15<sup>th</sup> Annual West Virginia IDeA Network for Biomedical Research Excellence (WV-INBRE), Morgantown WV, July 25, 2016.
35. Martin C, Schmitt D, Figurski L, Hayden A, **León F**, Pullman M, Horzempa J. Identification of plant and fungal extracts that exhibit antimicrobial activity against pathogenic bacteria. Poster. 15<sup>th</sup> Annual West Virginia IDeA Network for Biomedical Research Excellence (WV-INBRE), Morgantown WV, July 25, 2016.
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37. Vedanjali Gogineni, **Francisco León**, Marvin J. Nuñez, Narayan D. Chaurasiya, Babu L. Tekwani, Khaled M. Elokely, Michael L. Klein, Stephen J. Cutler. Isolation and Structural Elucidation of the Secondary Metabolites from *Calea urticifolia*. Sigma Xi Research Symposium, Hyatt Regency, Atlanta, GA. November 11-13, 2016.

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39. McMahan LR, Hiranita T, Wilkerson JL, **Leon-Oyola JF**, and McCurdy CR. Comparison of Discriminative-Stimulus Effects of Morphine and Mitragynine, the Primary Constituent in Kratom, Annual meeting of Safety Pharmacology Society, Washington DC, September 30 – October 3, 2018.
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41. Reeves ME, Restrepo LF, Pennington AE, Obeng S, Felix JS, Patel A, Lawson A, Patel J, Ho NP, Zandy SH, Wilkerson JL, **Leon Oyola JF**, Taylor VA, McCurdy CR, McMahan LR, and Hiranita T. Assessments of the Involvement of Alpha2-Adrenergic Receptors in the Discriminative Stimulus Effects of Typical and Atypical Opioids in Rats. 3rd UF Drug Discovery Symposium, Gainesville, FL, April 25- 26, 2019.
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- and anti-allergic activity of jacareubin derivatives. The 106 Annual Meeting of the American Association of Immunologist. Washington DC (May 11-15, 2023)
108. Z Stryker, SJ Cutler, **F León**. Semi-Synthetic phytocannabinoid dimers as potential therapeutics for neurological disorders. American Society of Pharmacognosy (ASP)-Annual Meeting. Washington DC (July 22-26, 2023)
109. Z Stryker, J Castillo-Arellano, SJ Cutler, **F León**. Design and synthesis of novel amino-phytocannabinoids as neurological therapeutics. Discover University of South Carolina USC. Columbia. SC (April 19, 2024).
110. A Cajati, **F León**. Synthesis of cannabinoquinones for cancer therapeutic treatments. Discover University of South Carolina USC. Columbia. SC (April 19, 2024)

### **TALKS AND SEMINARS:**

1. Isolation, Structural Elucidation and Synthesis of New Ceramides. **Francisco León**, Ignacio Brouard, Augusto Rivera, Jaime Bermejo. Oral Presentation, II Young Cancer Research Investigators, (Canary Islands Cancer Research Foundation), Playa Santiago, La Gomera, Spain, Dec 2005.
2. Los hongos como Fuente de Nuevos Metabolitos Secundarios (Spanish). **Francisco León**. Oral presentation, Young researchers (Ciclo jóvenes investigadores), Natural Products and Agrobiology Institute (Instituto de Productos Naturales y Agrobiología) Spanish National Research Council (Consejo Superior de Investigaciones Científicas - CSIC), San Cristobal de La Laguna, Spain, January 2010
3. Fungi as Continuous Source of New Metabolites. **Francisco León**. Oral Presentation, Mentouri University, Constantine, Algeria, April 2010.
4. Relevancia de la Diversidad Química Presente en Hongos **Francisco León**. Oral Presentation, XIV Semana Científica "Antonio González" La Laguna University, Bioorganic Institute, San Cristobal de La Laguna, Spain, October 2010.
5. Endofitos Búsqueda de Productos Bioactivos y Potencial Aplicación Industrial. **Francisco León**. Oral presentation, Chemistry Department, Los Andes University, Bogotá, Colombia, November 2012.
6. Fungi as Continuous Source of New Bioactive Compounds, IV scientific workshop in Natural Products Research. Oral presentation, **Francisco León**. Universidad de El Salvador, San Salvador, El Salvador, July 2013.
7. Isolation and Synthesis of Secondary Metabolites from North African Plants Mainly from Asteraceae and Dracaceae family. IV scientific workshop in Natural Products Research. Oral presentation, **Francisco León**. Universidad de El Salvador, San Salvador, El Salvador, July 2013.
8. Fungi as Continuous Source of New Metabolites. **Francisco León**. Oral Presentation. School of Pharmacy, University of Antioquia, Medellin, Colombia, August 2014.
9. Fungi and its Application in Biomedicine. **Francisco León**. Oral Presentation. School of Chemistry Sciences and Engineer, Baja California University, Tijuana, Mexico, October 2014.
10. Endophyte microorganism as a source of new pharmacology active secondary metabolites. Symposium MAX PLANCK tandem group leader. National University of Colombia, Bogota, Colombia, August 2015.

11. Inhibitors of cannabinoid and opioid receptors from natural sources. Autonomous University of Yucatan, Merida, Yucatan, Mexico, October 2015.
12. Potential curative del kratom: uso y abuso. University of La Laguna, Spain, October 2018.
13. Optimization for the isolation process of mitragynine, **Francisco León**, II International Symposium on Kratom. Orlando, FL, February 8-10, 2019.
14. Pharmacognosy and its Role in Drug Discovery (Farmacognosia y su role en el descubrimiento de medicamentos) University of Antioquia- Colombia, Institute of Chemistry, Medellin, Colombia September 10, 2020. Online.
15. *Mitragyna speciosa* (Kratom) y su potencial para tratar el dolor y la adicción, 1st international meeting of basic and applied research on Natural Products (1er foro internacional de investigación básica y aplicada de productos naturales, Tijuana, Baja California, December 14, 2020.
16. Folk Medicine and Drug Discovery, Natural Products Research Virtual Symposium, The West Virginia and Puerto Rico IDeA networks of Biomedical Research Excellence, January 29, 2021.
17. *Mitragyna speciosa* (Kratom) and its potential to treat pain and addiction. *XLIII Chemistry Symposium, School of Chemistry, Universidad Autonoma University of Yucatán, Mérida, México, 1/12/2022*

#### **TEACHING AND MEETINGS ORGANIZED:**

<b>Instructor</b> , Herbal Dietary Supplements and Alternative Therapies, PHCG 329, School of Pharmacy, University of Mississippi 2014 Overall Students Rating (1-5): 4.23 2015 Overall Students Rating (1-5): 4.38 2016 Overall Students Rating (1-5): 4.42	2014-2016
<b>Instructor</b> , Natural Products Derived Pharmaceuticals (Antimicrobial Agents and other Natural Products), PHCG 422, section taught: "Pharmacognosy and Alternative and Complementary Treatments" School of Pharmacy, University of Mississippi	2013-2017
<b>Instructor</b> , Foundation in Medicinal Chemistry I, PHMY-621, Sections taught: Cholinergic and adrenergic systems. College of Pharmacy, University of South Carolina	Fall 2020-
<b>Instructor</b> , Foundation in Medicinal Chemistry II, PHMY-624 Sections taught: Histaminic, glucocorticoids, estrogens, progestin, androgens, and diabetes pharmacotherapy. College of Pharmacy, University of South Carolina	Spring 2021-
<b>Committee Organizer</b> , 2 <sup>nd</sup> Meeting of the Young Cancer Research Investigators of the Canaries, Playa Santiago, La Gomera,	Dec/2005

Spain

**Committee Organizer**, Scientific Summer-Week for High School  
Students, Tenerife, Spain

June 2010  
June 2011  
June 2012

**SERVICE TO DISCIPLINE:**

*Scientific Journals:*

**Senior Editor**, Medicinal Chemistry Research, Springer USA, 2013-

**Editorial Board, Editor, Natural Products Section** Molecules MDPI, Switzerland  
2019-

**Guest Editor Associate**, Frontier in Pharmacology, 2021

**Editorial Board**, Scientific Report, Nature 2023-

**Served as Peer Review in Scientific Journals:** European Journal of Medicinal Chemistry; Phytochemistry, Molecules; Medicinal Chemistry Research, Natural Products Research, Revista Iberoamericana de Micología, Pest Management Science, Vitae, Current Microbiology, Phytochemistry letters, Pharmacy, Medicines, Marine drugs, Applied Sciences, Nanomaterials, Natural Products journal, Fitoterapia, Journal of Natural Products, ACS Pharmacology and Translation Sciences, Journal of Medicinal Chemistry, ACS Omega, Antibiotics, Current Medicinal Chemistry

**GRANT REVIEW SERVICE:**

2015-16 NIH IDeA INBRE Scientific Review Group – West Virginia INBRE  
2016-17 NIH IDeA INBRE Scientific Review Group – Puerto Rico INBRE  
2018 AAAS Research Competitiveness Program, (Natural Product Panel). Evaluation committee.  
2020 NIH IDeA INBRE Scientific Review Group – West Virginia INBRE  
2022 NIH IDeA INBRE Scientific Review Group – West Virginia INBRE  
2023 NIH Neurobiology of Pain (NPI) Study Section Washington DC (Oct 18-19, 2023)

**MENTORING:**

***Current Graduate Students:***

**Zacchary Stryker**, Department of Drug Discovery and Biomedical Sciences, University of South  
Carolina. Since 2021-

***Post doctorate:***



**Dr. Jorge Ivan Castillo**, Department of Drug Discovery and Biomedical Sciences, University of South Carolina. Since 2021-2024

**Pharm D. and Undergraduate Students:**

**Ms. ChiaoLi Chang, Pharm. D. student**, College of Pharmacy, University of South Carolina. Since spring 2023-2024

**Mr. Collin Sweeny, Pharm. D. student**, College of Pharmacy, University of South Carolina. Since spring 2023-

**Ms. Amber Cajati, Chemistry Major**, College of Liberal Arts, University of South Carolina. Since spring 2023-2024

**Mr. Haris Gill, Biology Major**, College of liberal Arts, University of South Carolina. Since fall 2023-2024

**Ms. Naomi Schlag, Chemistry Major**, College of Liberal Arts, University of South Carolina. Since spring 2024-

*Postgraduate Evaluation Committees*

<b>Mauricio Maldonado Villamil</b> , “Estudio Químico del Benzoaminal Macrocíclico 6H,13H-5, 12:7, 14-Dimetanodibenzo {1,3,6,8} tetrazecina DBTA” Chemistry Department, National University of Colombia, Bogota, Colombia	Jun/2006
<b>Nayra Rodriguez Perestelo</b> , “Metabolitos Secundarios Aislados de <i>Maytenus jelskii</i> (Celastraceae). Estudios de Relación Estructura Actividad” Chemistry and Engineering chemistry program, La Laguna University, San Cristobal de La Laguna, Tenerife, Spain	April/2010
<b>Fernando Torres Andon</b> , “Evaluación de Nuevos Compuestos como Potenciales Agentes Antileucémicos” Chemistry Department, Las Palmas de Gran Canaria University, Gran Canaria, Spain.	Jun/2010
<b>Sandra Devora Gutierrez</b> , “Estudio Químico y Farmacológico de Especies Botánicas Endémicas de Canarias” Basic biomedical Investigation program, La Laguna University, San Cristobal de La Laguna, Tenerife, Spain	Nov/2011
<b>Alex Adonai Osorio</b> , “Metabolitos Secundarios Aislados de <i>Cassine xylocarpa</i> y <i>Elaeodendron orientale</i> (Celastraceae): Potenciales Agentes Antivirales y Citotóxicos” Chemistry and Engineering chemistry program, La Laguna University, San Cristobal de La Laguna, Tenerife, Spain	May/2012

<b>Alejandro Enrique Ardiles</b> , “Metabolitos Secundarios de Especies de la Familia Celastraceae ( <i>Maytenus jelskii</i> y <i>Celastrus vulcanicola</i> ): Potenciales Agentes Terapéuticos” Chemistry and Engineering chemistry program, La Laguna University, San Cristobal de La Laguna, Tenerife, Spain	Sept/2012
<b>Jeongmin Park</b> , “Developing small peptidomimetics that can bind to cyclin F/A to inhibit their activities”. Master Thesis Committee, Department of Drug Discovery and Biomedical Sciences, College of Pharmacy, University of South Carolina, Columbia, SC	
<b>Robert Sears</b> , “Regular use of marijuana by people living with HIV-1 during highly active antiretroviral therapy results in faster clearance rates of circulating HIV-1 virus. The addition of a CB2 selective agonist as an adjunct to current therapeutic agents should result in a similar reduction in circulating HIV-1 and may reduce the likelihood of developing HIV-1 associated neurocognitive disorder” Ph.D. Committee Department of Drug Discovery and Biomedical Sciences, College of Pharmacy, University of South Carolina, Columbia, SC	

#### *Undergraduate Evaluation Committees*

- Ashli Fitzpatrick**, (B.S. Sally McDonnell Barksdale Honors College Thesis, University of Mississippi) 2014. Isolation and Structural Elucidation of Biologically Active Secondary Metabolites from *Perovskia atriplicifolia* Dec, 5, 2014
- John Carey Fitzpatrick**, (B.S. Sally McDonnell Barksdale Honors College Thesis, University of Mississippi) 2015. Exploration for Cannabinoid and Opioid Agents from Plants used in Traditional Medicine April, 30, 2015

#### *Graduate Students trained:*

- Eman Habib** (Ph.D. 2010). Isolation and Structural Elucidation of Biologically Active Compounds from Terrestrial and Fungal Organism.
- Jiangtao Gao** (Ph.D. 2010). Fungi-Derived Natural Products with Binding Affinities for Human Opioid or Cannabinoid.
- Xiaoning Wang** (Ph.D. 2012). Isolation, Structural Elucidation and Biological Evaluation of Natural Products from Plants and Fungi.
- Arindam Chatterjee** (Ph.D. 2013). Virtual Screening, Synthesis, and Biological Evaluation of Novel CDK-5 Inhibitors to Target Alzheimer 's disease
- Amer Tarawneh** (Ph.D. 2015). Synthesis of Biologically Active Natural Products.
- Vedanjali Gogineni** (Ph.D. 2017). Phytochemical Investigation of Psychoactive Medicinal Plants for the Treatment of Neurological Disorders.

*Undergraduate, Pharm D. Students directed/trained:*

- Andrew Smelser**, (PharmD, U. Mississippi) 2013-14. Isolation and Structural Elucidation of *Atriplex canescens* using Opioid Receptor Binding Assays.
- Christopher Hill**, (Exercise Science B.S., U. Mississippi) 2013-14. Isolation and Structural Elucidation of *Leonotis leonurus* using Cannabinoid Receptor Binding Assays.
- Deandre Kidd**, (B.S. Math, U. Mississippi) 2013-14. Isolation and Structural Elucidation of *Banisteropsis caapi* using Cannabinoid Receptor Binding Assays.
- Mallory Pullman**, (PharmD, U. Mississippi) Cobre internship summer 2014. Isolation and Structural Elucidation of *Salix laevigata* using Cannabinoid Receptor Binding Assays.
- Nicole Saccone**, (PharmD, U. Mississippi) Cobre internship summer 2014. Isolation and Structural Elucidation of *Verbascum densiflorum* using Cannabinoid Receptor Binding Assays.
- Ngoc Le**, (PharmD, U. Mississippi) Cobre internship summer 2014. Flower Tea and Human Psychotropic Effects. Presentation
- Daniel Zhu**, (PharmD, U. Mississippi) Cobre internship summer 2014. Human Cannabinoid and Opioid Receptor Inhibitory Activities of *Eschscholtzia californica*
- Caroline Morris**, (PharmD, U. Mississippi) 2014-2015. Isolation and Structural Elucidation of *Salix laevigata* using Cannabinoid Receptor Binding Assays.
- Mallory Pullman**, (PharmD, U. Mississippi) 2014-2015. Isolation and Structural Elucidation of *Verbascum densiflorum* using Cannabinoid Receptor Binding Assays.
- John Fitzpatrick**, (B.S. Sally McDonnell Barksdale Honors College Thesis, U. Mississippi) 2013-14. Isolation and Structural Elucidation of Biologically Active Secondary Metabolites from Plants Abused in the US.
- Ashli Fitzpatrick**, (B.S. Sally McDonnell Barksdale Honors College Thesis, U. Mississippi) 2014. Isolation and Structural Elucidation of Biologically Active Secondary Metabolites from Plants Abused in Pakistan.
- Alexia Mazique**, (Chemical Engineer B.S, U. Mississippi) Cobre internship summer 2015. *Mitragyna speciosa* a Psychoactive Plant.
- Ethan Casey**, (PharmD, U. Mississippi) summer 2015. Isolation and Structural Elucidation of *Banisteriopsis caapi* using Cannabinoid Receptor Binding Assays
- Caleb Martin**, (B.S Biology; preMed, University of West Liberty, WV-NISBRE) summer 2016 Identification of plant and fungal extracts that exhibit antimicrobial activity against pathogenic bacteria.
- Elliot Collins**, (B.S Biology; preMed, University of West Liberty, WV-NISBRE) summer 2016 Identification of novel natural immunostimulatory compounds that limit bacterial infection.
- Sterling Crenshaw**, (Pharm D, U. Mississippi) 2016. Culture and antifungal evaluation of three fungal strains ATCC 62909; ATCC 64543; ATCC 34655.

**Paula Paseiro**, (Biochemistry B.S., Florida State University) May-July 2018. Isolation of kratom alkaloids.

**Mallory Pullman**, (Pharm D, U. Mississippi) Sept-Oct 2018. Isolation of kratom alkaloids.

**Grant Zwolinski**, (PharmD, U. Florida) Jun-July 2019. Fractionation and identification of alkaloids in the polar fractions of *Mitragyna speciosa* (Kratom).

**Jiixin Xu**, (Biochemistry B.S., U Florida) Jun-sept 2019. Isolation of kratom alkaloids

**Marion Hope III**, (Biomedical Science Program, Rotation Graduate Program, University of South Carolina) March-May 2021

**Daniela Lorena Hernandez**, (Pharm. D. Universidad de Antioquia-Colombia) Aug-Dec 2021. Isolation of cannabinoids

**Laura Andrea Chavez**, (Pharm. D. Universidad de Antioquia-Colombia) Aug-Dec 2021. Isolation of cannabinoids

*Visitor Scholar directed/trained:*

**Isabel Gomez-Betancur**, “Study of the Analgesic Activity of Toxic and Inhibitory Effects of *Bothrops asper* venom by Extracts and Compounds Isolated from *Renealmia alpinia* Obtained by *in vitro* Propagation and Wild”, Antioquia University, Medellin, Colombia. May 5 to July 24, 2014.

**Farida Larit**, “Isolation and Structural Elucidation of Biologically Active Secondary Metabolites from Endemic Plants of Algeria”. University of Constantine, Constantine, Algeria. Sept 24 2014 to 30 July 2015.

**Sandra Judith Naranjo Gaybor**, “Search for quorum sensing inhibitory compounds from samples such as sponges and marine bacteria” National University of Colombia, Bogota, Colombia. February 1, 2016 through August 31, 2016.

**Nelson Chear**, “Alkaloids isolated from Malay *M. speciosa*” Universiti Sains, Malaysia. January 5, 2018 to July 31, 2018.

**Paula Katharina L. Meyer**, Fractionation, and identification of alkaloids in *Mitragyna speciosa* (Kratom). Aachen University, Germany April-October 2019

**Carolina Lopera-Londoño**, Fractionation and identification of alkaloids in *Mitragyna speciosa* (Kratom). University of Antioquia, Medellin, Colombia. October 2019 to February 2020.