

## CURRICULUM VITAE

### ALEXANDROS MAKRIYANNIS, Ph.D.

*George D. Behrakis Chair in Pharmaceutical Biotechnology,  
Professor of Pharmaceutical Science, Chemistry and Chemical Biology  
Director of the Center for Drug Discovery, Northeastern University*

#### EDUCATION:

1960 B.Ph. Chem., University of Cairo  
1967 Ph.D. (Medicinal Chemistry), University of Kansas (Supervisor E.E. Smissman)  
1967-69 Post-doctoral Fellow (Synthetic Organic Chemistry), University of California, Berkeley, CA (Supervisor H. Rapoport)

#### PROFESSIONAL SUMMARY:

1969-70 Senior Chemist, *Smith, Kline and French Laboratories*, Philadelphia, PA (Supervisor J. Wilson)  
1971-72 Research Associate, Department of Biochemistry and Pharmacology, *Tufts Medical School*, Boston, MA (Supervisor H. Mautner)  
1972-74 Assistant Professor, Department of Biochemistry and Pharmacology, *Tufts Medical School*, Boston, MA  
1974-80 Assistant Professor of Medicinal Chemistry, *University of Connecticut*, Storrs, CT  
1980-86 Associate Professor of Medicinal Chemistry, *University of Connecticut*, Storrs, CT  
1981-87 Head, Medicinal Chemistry and Pharmacognosy, School of Pharmacy, *University of Connecticut*, Storrs, CT  
1983-96 Visiting Scientist, F. Bitter National Magnet Laboratory, *Massachusetts Institute of Technology*, Cambridge, MA  
1985-91 Director and Founder, Institute of Organic and Pharmaceutical Chemistry, *National Hellenic Research Foundation* (Greece)  
1986-04 Professor of Medicinal Chemistry and Pharmacognosy, *University of Connecticut*, Storrs, CT  
Director of the Drug Design Program, Critical Technologies Initiative, *State of Connecticut*  
1994-04 Professor of Molecular and Cell Biology (joint), *University of Connecticut*, Storrs, CT  
1997-04 Director, Center for Drug Discovery, *University of Connecticut*, Storrs, CT  
1997-04 Professor of Pharmacology (joint), *University of Connecticut Health Center*, Farmington, CT  
1996-04 Board of Trustees' Distinguished Professor of Medicinal Chemistry and Molecular and Cell Biology, *University of Connecticut*, Storrs, CT  
2003- Founder, *MAKScientific* (Drug Discovery Start-up)  
2004- Adjunct Professor, Dept. Pharm. Sciences, *University of Connecticut*, Storrs, CT  
2004- George D. Behrakis Chair in Pharmaceutical Biotechnology, Professor of Chemistry & Chemical Biology and Pharmaceutical Sciences, and Director of the Center for Drug Discovery, *Northeastern University*, Boston, MA  
2012 Founder, *Pafos Pharma* (Drug Discovery Start-up)  
2014- Distinguished Adjunct Professor, Dept. of Chemistry, *King Abdulaziz University*, Saudi Arabia  
2016 New England Center for Addiction Research (Co-Founder)

#### HONORS:

McNeil Endowment Fellowship (1964-67)  
Research Scientist Award, NIDA (1990-95, 1995-2000)  
Fellow, American Association for the Advancement of Science (1993)  
President, International Cannabinoid Research Society (ICRS) (1993)

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Distinguished Scientist Award, University of Connecticut Alumni (1996)  
Fellow, American Association of Pharmaceutical Sciences (1997)  
National Institute of Health MERIT Awards (1997-2007, 2007-2017)  
Senior Scientist NIDA Award (2000-2011)  
Distinguished Professor, University of Connecticut, Board of Trustees (2002)  
Research Achievement Award in Drug Design and Discovery, American Association of Pharmaceutical Scientists (AAPS) (2002)  
Behrakis Trustee Chair in Pharmaceutical Biotechnology, Northeastern University (2004)  
Honorary Doctorate of Philosophy, University of Athens, Greece (2005)  
Recognition of Scholarly or Creative Work by Northeastern Faculty and Staff, Northeastern University (2005)  
Mechoulam Life Achievement Award in Cannabinoid Research (ICRS) (2006)  
Distinguished Patent Award, University of Connecticut (2007)  
Kenneth E. Avis Award in Medicinal Chemistry (2007)  
Marquis Who's Who in Science and Engineering (2007)  
ACS Research Lifetime Achievement Award in Medicinal Chemistry (2012)  
Annual NU Award for Excellence in Research and Creativity (2012)  
ACS Medicinal Chemistry Hall of Fame (2013)  
Highly Cited Researcher, Thomson Reuters (2014)  
Distinguished Professor, Northeastern University (2015)  
AAPS Distinguished Pharmaceutical Scientist Award (2015)  
Honorary Doctorate of Philosophy, University of Crete Medical School, Greece (2018)  
CPDD Nathan B. Eddy Memorial Award (2018)  
ICRS President's Lecture (2019)

#### **FIELDS OF SPECIALIZATION:**

Target-based drug design and synthesis; chemical biology; chemical pharmacology; membrane and protein biophysics (LC/MS/MS-NMR); proteomic and metabolomic LC/MS technologies

#### **RESEARCH INTERESTS:**

Cannabinergic agents; drugs of abuse; structure and function of G-protein coupled receptors and enzymes; enzyme inhibitors; drug-membrane interactions; neurosteroids; endocannabinoid biomarkers

#### **CONSULTING ACTIVITIES:**

Glaxo Wellcome; Bristol Myers; Genaissance Pharmaceuticals (Co-Chair, Scientific Advisory Board); Medochemie (Cyprus); Pfizer; Synaptic Corporation; MAKScientific (Chairman Scientific Advisory Board); Forest Laboratories, Inc.; Biogen Idec; Aileron Therapeutics; Nestle; Ischemix, Inc.

#### **ADVISORY APPOINTMENTS:**

Consultant Intramural NIAAA Biophysics Research Program (1985-87)  
Ad Hoc Member, NIDA Study Section (1985-89)  
Senior Advisor National Research Council of Greece (1985-present)  
NIDA Special Rev. Committee (1987-2000)  
Member of Ad Hoc Committee NIAID (1990-1992)  
Member, NIDA-L Medications Development Review Committee (1998-2004); Chair (2001-2004)  
Member, NIH MCDN-5 Review Committee (1998-2008)

American Association of Pharmaceutical Scientists (AAPS)-Chair, Division of Medicinal Chemistry and Natural Products (1998-99); Chair, Division of Drug Design and Discovery (1999-00)  
 Member, Nat. Advisory Council for the Center for Medicinal Cannabis Research (2001-present)  
 Member, External Review Board, Institut de Recherches Cliniques de Montreal (2006-present)  
 Member, Scientific Review Board of the Institute for the Study of Aging, Alzheimer's Drug Discovery Foundation (2007-present)  
 Member, NIH Drug Discovery Scientific Study Section (2008-2012)  
 Member of Industry Consulting Board, Tufts Clinical and Translational Science Institute, Tufts Medical Center, Boston, MA (2009)  
 Member, Drug Discovery for the Nervous System Review Group (2009-present)  
 Member, Awards Committee, American Association of Pharmaceutical Scientists (AAPS) (2010-present)  
 Board Member, Alzheimer Drug Discovery Foundation (2016 - present)  
 Molecular Neuropharmacology and Signaling Study Section, Center for Scientific Review (2019-present)

#### **EDITORIAL ACTIVITIES:**

1999-04 PharmSci, Senior Associate Editor for Medicinal Chemistry  
 2001-06 Member, Editorial Board, Il Farmaco  
 2002-07 Member, Editorial Board, Journal of Medicinal Chemistry  
 2002- Member, Editorial Advisory Board, Letters in Drug Design and Discovery  
 2010- Member, Editorial Board, Global Journal of Organic Chemistry  
 2014- Member, Editorial Board, American Journal of Pharmaceutical Sciences  
 2014- Member, Editorial Board, Journal of Nanomedicine Research  
 2015- Member, Editorial Board, Computational Drug Discovery  
 2017- Member, Editorial Board, Journal of Addiction Research

#### **ACADEMIC ACTIVITIES:**

1976-04 Member, Institute of Materials Science, University of Connecticut, Storrs, CT  
 1980-87 Member, Polymer Science Program, University of Connecticut, Storrs, CT  
 1983-11 Chairman, Organizing Committee for 1st through 12th Cyprus Conference on "New Methods in Drug Research"  
 1987-98 Member, Biomolecular and Structural Analysis Center, University of Connecticut Health Center, Farmington, CT  
 2007-08 Member, Research Policy Oversight Committee, Northeastern University, Boston, MA  
 2011-12 Member, Research Policy Oversight Committee, Northeastern University, Boston, MA  
 2011- Member, Dean's Leadership Team, Northeastern University, Boston, MA  
 2011- Member, Tenure and Promotion Committee, Pharmaceutical Sciences, Northeastern University, Boston, MA  
 2013-15 Member, Faculty Senate, Northeastern University, Boston, MA  
 2013- Affiliated Professor, Bioengineering Graduate Program, Northeastern University, Boston MA  
 2017- Founder, Chemistry and Pharmacology of Drug Abuse Conference, Northeastern University, Boston, MA

#### **PROFESSIONAL MEMBERSHIPS:**

American Chemical Society (ACS), American College of Neuropsychopharmacology (ACNP) Emeritus Membership Status, The Protein Society, American Association for the Advancement of Science (AAAS, Science), American Association of Colleges of Pharmacy (AACP), The Society of Neuroscience (SfN), American Society for Pharmacology and Experimental Therapeutics (ASPET), The New York Academy of

Science, Molecular Neuropharmacology and Signaling Study Section (MNPS), American Society for Biochemistry and Molecular Biology (ASBMB), American Association of Pharmaceutical Scientists (AAPS), International Cannabinoid Research Society (ICRS), American Society for Microbiology (ASM), American Society for Neurochemistry (ASN)

#### INVENTIONS:

- 1995 “Compositions Useful as a Cannabinoid Receptor Probe” – A. Makriyannis, G. Yan, V. Abadji  
 1996 “Phospholipid Compounds and Use Thereof” – A. Makriyannis, R. Duclos Jr., D. Fournier  
 1997 “Anandamide Amidase Inhibitors as Analgesic Agents” – A. Makriyannis, S. Lin, W. Hill  
 1998 “Phospholipid Compounds and Use Thereof” – A. Makriyannis, R. Duclos, Jr., D. Fourier  
 1999 “Compositions Useful as a Cannabinoid Receptor Probe” – A. Makriyannis, Y. Guo, V. Abadji  
 1999 “Anandamide Amidase Inhibitors as Analgesic Agents” – A. Makriyannis, S. Yin, W. Hill  
 2000 “Cannabinoids Selective for the CB2 Receptor” – A. Makriyannis, A. Khanolkar, D. Lu  
 2002 “Anandamide Inhibitors as Analgesic Agents” – A. Makriyannis, S. Yin, W. Hill  
 2003 “Anandamide Amidase Inhibitors as Analgesic Agents” – A. Makriyannis, S. Yin, W. Hill  
 2005 “Bicyclic cannabinoid Agonists for the Cannabinoid Receptor” – A. Makriyannis, A. Khanolkar  
 2005 “Cannabimimetic Indole Derivatives” – A. Makriyannis, H. Deng  
 2005 “Analgesic and Immunomodulatory Cannabinoids” – A. Makriyannis, D. Lu, A. Khanolkar  
 2006 “Peripheral Cannabinoid Receptor (CB2) Selective Ligands” – A. Makriyannis, A. Khanolkar  
 2006 “Bicyclic and Tricyclic Cannabinoids” – A. Makriyannis, S. Nikas, A. Khanolkar  
 2006 “GABA A Modulating Neurosteroids” – A. Makriyannis, T. Calogeropoulou, A. Tsotinis, C. Souli  
 2006 “Bifunctional Agents Possessing Antioxidant and Antiarrhythmic Activity” – A. Makriyannis, M. Koufaki, T. Calogeropoulou  
 2006 “Pyrazole Derivatives as Cannabinoid Receptor Antagonists” – A. Makriyannis, Q. Liu  
 2007 “Cannabimimetic Lipid Amides as Useful Medications” – A. Makriyannis, A. Khanolkar, A. Goutopoulos  
 2007 “Receptor Selective Cannabimimetic Aminoalkylindoles” – A. Makriyannis, H. Deng  
 2007 “Keto Cannabinoids with Therapeutic Indications” – A. Makriyannis, D. Lu, X. Lai  
 2007 “Cannabimimetic Indole Derivatives” – A. Makriyannis, H. Deng  
 2007 “Retro-anandamides, High affinity and Stability Cannabinoid Receptor Ligands” – A. Makriyannis, Q. Liu, A. Goutopoulos  
 2007 “Bicyclic and Tricyclic Cannabinoids” – A. Makriyannis, S. Nikas, A. Khanolkar  
 2008 “Bicyclic Cannabinoid Agonists for the Cannabinoid Receptor.” – A. Makriyannis, A. Khanolkar  
 2008 “Cannabimimetic Ligands” – A. Makriyannis, H. Deng  
 2008 “Pyrazole Analogs Acting on Cannabinoid Receptors” – A. Makriyannis, Q. Liu, R. Thotapally  
 2008 “Bicyclic Cannabinoids” – A. Makriyannis, S. Nikas, A. Khanolkar, G. Thakur, D. Lu  
 2008 “Heteroaryl Urea Compounds as Endocannabinoid Enzyme Deactivators and a Method of Their Evaluation” – A. Makriyannis, L. Pandarinathan, N. Zvonok, T. Pakkari, L. Chapman  
 2009 “Inhibitors of the Anandamide Transporter” – A. Makriyannis, A. Goutsopoulos, C. Li  
 2010 “Heteroindanes: A New Class of Potent Cannabimimetic Ligands” – A. Makriyannis, Q. Liu, A. Zvonok  
 2010 “Peripheral Cannabinoid Receptor (CB2) Selective Ligands” – A. Makriyannis, A. Khanolkar  
 2010 “Pyrazole Analogs Acting on Cannabinoid Receptors” – A. Makriyannis, Q. Liu, R. Thotapally  
 2010 “Receptor Selective Cannabimimetic Aminoalkylindoles” – A. Makriyannis, H. Deng  
 2011 “Inhibitors of the Anandamide Transporter” – A. Makriyannis, S. Lin, D. Piomelli  
 2011 “Pyrazole Derivatives as Cannabinoid Receptor Antagonists” – A. Makriyannis, Q. Liu, R. Thotapally, V.K. Vemuri  
 2011 “Novel Heteropyrrole Analogs Acting on Cannabinoid Receptors” – A. Makriyannis, V.K. Vemuri, T. Olszewska

- 2011 "Method of Developing Cannabinoids with Controlled Duration of Action and Uses Thereof" – A. Makriyannis, G.A Thakur, R. Sharma
- 2011 "Cannabinergic Resorcinol Analogs" – A. Makriyannis, S. Bajaj, M.R D'Souza, S. Nikas, G. Thakur
- 2012 "Novel Cannabinergic Nitrate Esters and Related Analogs" – A. Makriyannis, V.K. Vemuri
- 2012 "Antiprotozoal Ring-substituted Phospholipids" – A. Makriyannis, T. Calogeropoulou, M. Koufaki, N. Avlonitis
- 2012 "Cannabinergic Lipid Ligands" – A. Makriyannis, C. Li, D. Lu
- 2012 "CB1 Receptor Antagonists and Uses Thereof" – A. Makriyannis, V.K. Vemuri
- 2012 "Therapeutic Applications of Fatty Acid Amide Hydrolase Inhibitors" – A. Makriyannis, G. Kunos
- 2013 "Heteropyrrole Analogs Acting on Cannabinoid Receptors" – A. Makriyannis, R. Thotapally, V.K. Vemuri, T. Olszweska
- 2014 "Heteropyrrole Analogs Acting on Cannabinoid Receptors" – A. Makriyannis, V.K. Vemuri
- 2014 Novel Urea and Carbamates FAAH MAGL or Dual FAAH/MAGL Inhibitors and their Uses Thereof" – A. Makriyannis, V.G. Shukla, S.O. Alapafuja
- 2014 "N-Acylethanolamine Hydrolyzing Acid Amidase (NAAA) Inhibitors and their Use Thereof" – A. Makriyannis, M. Malamas, K.V Subramanian, K. Whitten, N. Zvonok, J.M West, S. Pavlopoulos
- 2015 "Fatty Acid Amide Hydrolase Inhibitors" – A. Makriyannis, S. Nikas, S.O. Alapafuja, V.G. Shukla
- 2016 "Inhibitors of Fatty Acid Amide Hydrolase and Monoacylglycerol Lipase for Modulation of Cannabinoid Receptors" – A. Makriyannis, L. Pandarinathan, N. Zvonok, T. Parkkari, L. Chapman
- 2016 "2-Cycloalkyl Resorcinol Cannabinergic Ligands" – A. Makriyannis, M.R. D'Souza, S. Bajaj, S. Nikas, G. Thakur
- 2017 "Cannabinergic Nitrate Esters and Related Analogs" – A. Makriyannis, V.K. Vemuri
- 2017 "Carbamates ABHD6 and Dual ABHD6/MGL Inhibitors and their Use Thereof"- A. Makriyannis, M. Malamas, M. Lamani, S.I. Farah
- 2020 "Urea/Carbamates FAAH MAGL or Dual FAAH/MAGL Inhibitors and Uses Thereof" – A. Makriyannis, V. Shukla, S. Alapafuja
- 2020 "Cannabinergic Compounds and Uses Thereof" – A. Makriyannis, S. Nikas, G. Thakur, S. Kulkarni, S. Sharma
- 2021 "Method of Developing Cannabinoids with Controlled Duration of Action and Uses Thereof" – A. Makriyannis, G. Thakur, R. Sharma
- 2022 "Urea/Carbamates FAAH MAGL or Dual FAAH/MAGL Inhibitors and Uses of Thereof" – A. Makriyannis, V. Shukla, S. Alapafuja
- 2023 "Novel Endocannabinoid Ligands and Related Analogs" – A. Makriyannis, S.P. Nikas, L. Ji, Y. Liu, F. Tong, M. Georgiadis
- 2023 "Novel Labelled Cannabinergic Ligands and Related Analogs" – A. Makriyannis, S.P. Nikas, C. Iliopoulos-Tsoutsouvas, S. Kulkarni, L. Ji
- 2023 "Methods for Treating Alcohol Addiction, Alcohol-Use Disorders and Alcohol-Related Inflammatory Diseases" – A. Makriyannis, K. Vemuri, J. Raghav (**PENDING**)

## PUBLICATIONS:

1. Smissman E.E., **A. Makriyannis**, (1970), Solvent effects in the NMR spectra of cyano compounds. *J. Pharm. Sci.*, **59**, 1186. PMID: 5457343

2. Smissman E.E., **A. Makriyannis**, E.J. Walaszek, (1970), Synthesis and pharmacology of N-Cyano-( $\beta$ -Arylethyl) amines. *J. Med. Chem.*, **13**, 640. PMID: 5466125
3. **Makriyannis A.**, R.F. Sullivan, H.G. Mautner, (1972), Conformational relationships between analogs of acetylcholine and those of local anesthetics in solution. *Proc. Natl. Acad. Sci.*, **69**, 3416. PMID: 4508331
4. **Makriyannis A.**, J.S. Frazee, J.W. Wilson, (1972), 3-Phenyl-5-quinolinemethanol antimalarials. *J. Med. Chem.*, **16**, 118-122. PMID: 4566626
5. **Makriyannis A.**, W.H.H. Gunther, H.G. Mautner, (1973), Selenol esters as specific reagents for the acylation of thiol groups. *J. Am. Chem. Soc.*, **95**, 8403-8406.
6. Smissman E.E., **A. Makriyannis**, (1973), Azodicarboxylic acid esters as dealkylating agents. *J. Org. Chem.*, **38**, 1652. PMID: 4709670
7. Feinstein M.B., M. Volpi, S. Perrie, **A. Makriyannis**, R.I. Sha'afi, (1977), Mechanisms of local anesthetic action on the permeability of erythrocytes, leukocytes and liposomes containing the erythrocyte anion channel protein. *Mol. Pharmacol.*, **13**, 840-851. PMID: 897520
8. **Makriyannis A.**, J. Knittel, (1978), Conformational studies on phenethylamine hallucinogens: The role of  $\alpha$ -alkyl substitution. *NIDA Research Monograph Series*, **22**, 464-481. PMID: 101888
9. **Makriyannis A.**, J. Knittel, (1979), The conformational analysis of aromatic methoxyl groups from carbon-13 chemical shifts and spin lattice relaxation times. *Tet. Lett.*, **20**, 2753-2756.
10. **Makriyannis A.**, J. Theard, H.G. Mautner, (1979), A direct approach to the determination of the rotational barriers of the acetylcholine and choline molecules. *Biochem. Pharmacol.*, **28**, 1911-1915. PMID: 454463
11. **Makriyannis A.**, G. Hite, (1979), Nortropacocaine hydrochloride conformation in aqueous and hydrophobic media. *J. Pharm. Sci.*, **68**, 788-790. PMID: 458585
12. **Makriyannis A.**, J.B. Anderson, J. DiPiro, E. Kostiner, G. Hite, (1979), Steric requirements for adrenergic activity. I. The crystal structure of  $\beta$ - (2-hydroxy-phenyl) ethanolamine hydrochloride. *Acta. Crystal. B.*, **35**, 2247-2250.
13. Williams D.A., **A. Makriyannis**, (1979), Carbon-13 and proton magnetic resonance spectra of 2, 4-disubstituted 3, 3-diphenyltetrahydrofurans derived from isomethadone and isomethadol. *J. Hetero. Chem.*, **16**, 1223-1226.
14. **Makriyannis A.**, S.W. Fesik, (1980), Effects of anesthetics on sulfate transport in the red cell. *J. Neurosci. Res.*, **5**, 25-33. PMID: 7381978
15. Weintraub J.R., D.E. Nichols, **A. Makriyannis**, S.W. Fesik, (1980), Conformational energy differences between side chain-alkylated analogues of the hallucinogen DOM. *J. Med. Chem.*, **23**, 339- 341. PMID: 7365752
16. Henkel J.G., N. Sikand, **A. Makriyannis**, (1981), Synthesis and adrenoreceptor affinity of some highly polar  $\beta$ -substituted catecholamines. *J. Med. Chem.*, **24**, 1258-1260. PMID: 7328588
17. Knittel J., **A. Makriyannis**, (1981), Studies on phenethylamine hallucinogens. 2. Conformations of arylmethoxyl groups using  $^{13}\text{C}$  NMR. *J. Med. Chem.*, **24**, 906-909. PMID: 7277405
18. **Makriyannis A.**, J. Knittel, (1981), The conformational analysis of amphetamine in solution based on the unambiguous assignment of diastereotopic benzylic protons in the  $^1\text{H}$  NMR spectra. *Tet. Lett.*, **22**, 4631-4634.
19. de Jong A.P., S.W. Fesik, **A. Makriyannis**, (1982), Conformational requirements for norepinephrine uptake inhibition by phenethylamines in brain synaptosomes. Effects of  $\alpha$ -alkyl substitution. *J. Med. Chem.*, **25**, 1438-1441. PMID: 7154004
20. de Jong A.P., F. Huggins, D. Fournier, **A. Makriyannis**, (1982), Inhibition of [ $^3\text{H}$ ]5-HT binding to rat brain membranes by psychotomimetic amphetamines. *Eur. J. Pharmacol.*, **83**, 305-308. PMID: 7173311
21. **Makriyannis A.**, S.W. Fesik, (1982), Methoxy group conformations of phenyl methyl ethers in solution. *J. Am. Chem. Soc.*, **104**, 6462-6463.
22. **Makriyannis A.**, D. Bowerman, P.Y. Sze, D. Fournier, A.P. de Jong, (1982), Structure activity correlations in the inhibition of brain synaptosomal  $^3\text{H}$ -norepinephrine uptake by phenethylamine

- analogs: The role of  $\alpha$ -alkyl side chain and methoxyl ring substitutions. *Eur. J. Pharmacol.*, **81**, 337-340. PMID: 7117379
23. Naccache P., M. Volpi, E.L. Becker, **A. Makriyannis**, R.I. Sha'afi, (1982), Cannabinoid induced degranulation of rabbit neutrophils. *Biochem. Biophys. Res. Commun.*, **104**, 6462. PMID: 6288043
  24. **Makriyannis A.**, J.L. Nilsson, (1983), Designing new drugs. *Pharmacy International*, **4**, 193.
  25. **Makriyannis A.**, S.W. Fesik, (1983), Mechanism of steroid anesthetic action: interactions of alphaxalone and  $\Delta^{16}$ -alphaxalone with bilayer vesicles. *J. Med. Chem.*, **26**, 463-465. PMID: 6834378
  26. Fesik S.W., **A. Makriyannis**, (1985), Geometric requirements for membrane perturbation and anesthetic activity. Conformational analysis of alphaxalone and  $\Delta^{16}$ -alphaxalone and  $^2\text{H}$  NMR studies on their interactions with model membranes. *Mol. Pharmacol.*, **27**, 624-629. PMID: 4000106
  27. **Makriyannis A.**, S. Fesik, R. Kriwacki, (1985), Nuclear magnetic resonance in drug research. New methods in drug research. *J.R. Prous Science Publishers*, **1**, 19-43.
  28. Ruocco M.T., **A. Makriyannis**, D.J. Siminovitch, S. Das Gupta, R.G. Griffin, (1985), Deuterium NMR study of ether and ester-linked phosphatidylcholines. *Biochemistry*, **24**, 4844-4851. PMID: 4074662
  29. **Makriyannis A.**, D.J. Siminovitch, S.K. Das Gupta, R.G. Griffin, (1986), Studies on the interactions of anesthetic steroids with phosphatidylcholine using  $^2\text{H}$  and  $^{13}\text{C}$  solid-state NMR. *Biochim. Biophys. Acta.*, **859**, 49-55. PMID: 3755060
  30. Banijamali A., **A. Makriyannis**, (1987), Separation of tetrahydrocannabinol isomers by reverse-phase high pressure liquid chromatography. *J. Liq. Chromatogr.*, **10**, 2931-2938.
  31. Banijamali A., A. Charalambous, C.J. Van der Schyf, **A. Makriyannis**, (1987), Specific deuteration of phenols and aromatic ethers using borontrifluoride and deuterium oxide. *J. Label. Compounds*, **24**, 1479-1482.
  32. **Makriyannis A.**, A. Banijamali, H. Jarrell, C.J. Van der Shyf, (1987), Interactions of cannabinoids with membranes: The role of the cannabinoid stereochemistry and absolute configuration and orientation of  $\Delta^9$ -THC in the cannabinoid bilayer. *NIDA Research Monograph Series*, **79**, 123-133. PMID: 2830533
  33. Siminovitch D.J., M. Ruocco, **A. Makriyannis**, R.G. Griffin, (1987), The effect of cholesterol on lipid dynamics and packing in diether phosphatidylcholine bilayers. X-ray diffraction and  $^2\text{H}$ -NMR study. *Biochim. Biophys. Acta.*, **901**, 191-200. PMID: 3607045
  34. Banijamali A., N. Abou Taleb, A. Charalambous, C.J. Van der Schyf, **A. Makriyannis**, (1988), Synthesis of deuterium labeled cannabinoids. *J. Label. Compounds*, **25**, 73-82.
  35. **Makriyannis A.**, A. Banijamali, (1988), A novel synthesis of (-)-trans- $\Delta^{9,11}$ -tetrahydrocannabinol. *J. Heterocyclic Chem.*, **25**, 823-825.
  36. Van der Schyf C.J., T. Mavromoustakos, **A. Makriyannis**, (1988), The conformation of (-)  $8\alpha$  and (-)  $8\beta$ -hydroxy- $\Delta^9$ -tetrahydrocannabinols and their interactions with model membranes. *Life Sci.*, **42**, 2231-2239. PMID: 2836679
  37. Abdelmageed O., D. Siminovitch, M. Ruocco, R.I. Duclos Jr., R.G. Griffin, **A. Makriyannis**, (1989), Syntheses of  $^2\text{H}$ - and  $^{13}\text{C}$ -labeled 1,2-di-O-hexadecyl-sn-glycero-3-phosphoethanolamines and 1,2-di-O-hexadecyl-sn-glycero-3-phosphocholines. *Chem. Phys. Lipids*, **50**, 163-169.
  38. Kriwacki R.W., **A. Makriyannis**, (1989), The conformational analysis of  $\Delta^9$ - and  $\Delta^{9,11}$ -tetrahydrocannabinols in solution using high resolution nuclear magnetic resonance spectroscopy. *Mol. Pharmacol.*, **35**, 495-503. PMID: 2539557
  39. Lee C.W., G.S. Das, J. Mattai, G.G. Shipley, M.O. Abdel, **A. Makriyannis**, R.G. Griffin, (1989), Characterization of the L- phase in trehalose-stabilized dry membranes by solid-state NMR and X-ray diffraction. *Biochemistry*, **28**, 5000-5009. PMID: 2765521
  40. **Makriyannis A.**, A. Banijamali, H.C. Jarrell, D.P. Yang, (1989), The orientation of (-)  $\Delta^9$ -tetrahydrocannabinol in DPPC bilayers as determined from solid-state  $^2\text{H}$ -NMR. *Biochim. Biophys. Acta.*, **986**, 141-145. PMID: 2554980

41. **Makriyannis A.**, T. Mavromoustakos, (1989), Studies on drug membrane interactions using solid state NMR, small angle X-ray diffraction and differential scanning calorimetry. *Rev. Clin. Pharmacol. Pharmacokinetics, Int. Ed.*, **3**, 95-114. PMID: 1753995
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**CHAPTERS IN BOOKS:**

1. **Makriyannis A.**, R.S. Rapaka, (1987), The Medicinal Chemistry of Cannabinoids: An Overview in *NIDA Research Monograph Series*, **79**, 1-16.
2. **Makriyannis A.**, (1987), Nuclear Magnetic Resonance in Drug Research. Some New Developments in *New Methods in Drug Research*, J. R. Prous Science Publishers, Barcelona, Spain, **2**.
3. **Makriyannis A.**, (1988), Amphipathic Interactions of Drugs with Model Membranes as Studied by Solid-State NMR in *Antiarrhythmic Agents*, L. Hondeghem, Ed., Futura Publishing Co., Mount Kisco, NY, **19**, 1-5.
4. **Makriyannis A.**, (1988), Molecular features of drug-induced membrane perturbation as studied by solid-state NMR, in *NMR Spectroscopy and Drug Development: The Alfred Benzon Symposium*, J.W. Jaroszewski, K. Schaumburg, H. Kofod, Eds., Munksgaard, Copenhagen, **26**, 437-451.
5. **Makriyannis A.**, (1988), Use of solid-state NMR techniques in drug research, in *Molecular Basis of the Action of Drugs and Toxic Substances*, N. Castagnoli, W. deGruyter, Eds., New York, NY, 225-236.
6. **Makriyannis A.**, D.P. Yang, (1989), Solid-State NMR Spectroscopy in the Study of Drug Membrane Interactions; Potential Applications with Antiarrhythmic Agents in *Molecular and Cellular Mechanisms of Antiarrhythmic Agents*, L. Hondeghem, Ed., Futura Publishing Co., Mount Kisco, NY, **20**, 293-305.
7. **Makriyannis A.**, T. Mavromoustakos, H. Jarrell, A. Banijamali, (1988), The role of phenolic hydroxyl group during the tetrahydrocannabinol: Membrane interactions in *Marijuana: An International Research Report*, G. Chesher, P. Consroe, R. Musty, Eds., Australian Publishing Service, Canberra, 321-326.
8. **Makriyannis A.**, D.P. Yang, T. Mavromoustakos, (1990), The molecular features of membrane perturbation by anesthetic steroids: A study using differential scanning

- calorimetry, small angle x-ray diffraction and solid state <sup>2</sup>H NMR in *Ciba. Found. Symp.*, **153**, 172-184.
9. **Makriyannis A.**, D.P. Yang, T. Mavromoustakos, (1991), Combined use of solid-state nuclear magnetic resonance spectroscopy, small-angle x-ray diffraction and differential scanning calorimetry in studies of cannabinoid: Membrane interactions in *NIDA Research Monograph Series*, **112**, 106-128.
  10. Rapaka R.S., **A. Makriyannis**, M. Kuhar, (1991), Emerging Technologies in Drug Abuse Research: An Overview in *NIDA Res. Monogr.*, **112**, 106-128.
  11. **Makriyannis A.**, (1993), Probes for the cannabinoid sites of action in *NIDA Research Monograph Series*, **134**, 253-267.
  12. **Makriyannis A.**, D.P. Yang, (1994), How to Study Drug: Membrane Interactions Using Differential Scanning Calorimetry, Solid State NMR and Small Angle X-Ray Diffraction. **17**, 329-348. in *Recent Advances in the Study of Neurotransmitter Receptors*, B.N. Dhawan, R.C. Srimal, R. Raghbir, R.S. Rapaka, Eds., CDRI, Lucknow, India.
  13. Mavromoustakos T., E. Theodoropoulou, J. Matsoukas, G. Moore, **A. Makriyannis**, (1994), Interactions of ANG II with Membranes Using a Combination of Differential Scanning Calorimetry and <sup>31</sup>P-NMR in *Aminoacids, Peptides, Proteins, Drug Discovery and Design*, J. Matsoukas, Ed., Royal Society of Chemistry, Cambridge, 88-94.
  14. Mavromoustakos T., E. Theodoropoulou, D.P. Yang, **A. Makriyannis**, (1994), The use of molecular graphics to study the conformational properties of biologically active molecules in *Aminoacids, Peptides, Proteins, Drug Discovery and Design*, J. Matsoukas, Ed., Royal Society of Chemistry, Cambridge, 78-83.
  15. **Makriyannis A.**, (1995), The Role of Cell Membranes in Cannabinoid Activity in *Cannabinoid Receptors*, R. Pertwee, Ed., Academic Press, New York, 87-116.
  16. Khanolkar A.D., **A. Makriyannis**, (1999), Structure-activity relationships of anandamide, an endogenous cannabinoid ligands, in *Life Sci., Special Symposium Issue on Cannabinoids*, **65**(6-7), 607-616.
  17. Gatley S.J., N.D. Volkow, **A. Makriyannis**, (1999), Studies of the Brain Cannabinoid System Using Positron and Single-Photon Emission Tomography, in *Marihuana and Medicine*, G.G. Nahas, K.M. Sutin, S. Agurell, Eds., Humana Press, Totowa, 163-176.
  18. **Makriyannis A.**, S. Pavlopoulos, (1999), Structural Chemistry Using NMR Spectroscopy, Pharmaceuticals in: *Encyclopedia of Spectroscopy & Spectrometry*, J. Lindon, G. Tranter, J. Holmes, Eds., Academic Press, London, **3**, 2261-2271.
  19. Schuel H., M.C. Chang, L.J. Burkman, R.P. Picone, **A. Makriyannis**, A.M. Zimmerman, S. Zimmerman, (1999), Cannabinoid Receptors in Sperm in *Marihuana and Medicine*, G.G. Nahas, K.M. Sutin, S. Agurell, Eds., Humana Press, Totowa, 335-345.
  20. Palmer S.L., G.A. Thakur, **A. Makriyannis**, (2002), Cannabinergic ligands in *Chem. Phys. Lipids*, **121**(1-2), 3-19.
  21. Palmer S.L., A.D. Khanolkar, **A. Makriyannis**, (2002), Endocannabinoid Proteins and Ligands in *Biology of Marijuana: From Gene to Behavior*, E.S. Onaivi, Ed., Taylor and Francis, Inc., New York, NY, **18**, 491-522.
  22. Gatley S.J., A.N. Gifford, Y.S. Ding, R. Lan, Q. Liu, N.D. Volkow, **A. Makriyannis**, (2003), Development of PET and SPECT radioligands for cannabinoid receptors in *Drug Discovery Strategies and Methods*, **A. Makriyannis**, D. Biegel, Eds., CRC Press, New York, NY, **1**, 129-146.
  23. **Makriyannis A.**, A. Goutopoulos, (2004), Cannabinergics: Old and new therapeutic possibilities in *Drug Discovery Strategies and Methods*, **A. Makriyannis**, D. Biegel, Eds., CRC Press, New York, NY, **1**, 89-128.
  24. Rapaka R., **A. Makriyannis**, V. DiMarzo, D. Piomelli, (2005), Targeted lipidomics: endocannabinoids and other endolipid modulators in *Life Sci.*, **77**(14), 1517-1518.

25. Guo J., X. Tian, S. Pavlopoulos, **A. Makriyannis**, (2006), Phospholipid bicelle membrane systems for studying drug molecules in *Handbook of Modern Magnetic Resonance*, G.A. Webb, D. Craik, Eds., Kluwer Academic Publishers, London, UK.
26. G.A. Thakur, S.P. Nikas, R.I. Duclos, **A. Makriyannis**, (2006), Methods for Synthesis of Cannabinergic Ligands in *Marijuana and Cannabinoid Research: Methods and Protocols*, E.S. Onaivi, **7**, 113-148, Humana Press, Totowa, NJ.
27. V. K. Vemuri, **A. Makriyannis**, (2009), Endocannabinoids and their Synthetic Analogs in *The Cannabinoid Receptors*, P.H. Reggio, Humana Press, Totowa, NJ.
28. S. Jiang, F. Yigong, S. Avraham, **A. Makriyannis**, H.V. Avraham, (2012), Regulation of Stem Cells by the Endocannabinoid System in *Stem Cells and Cancer Stem Cells: Therapeutic Applications in Disease and Injury*, **6** (30), 345-352. M.A. Hayat, Springer Dordrecht Heidelberg, New York, NY.
29. J.A. Hartsel, J. Eades, B. Hickory, **A. Makriyannis**, (2016), Cannabis Sativa and Hemp in *Nutraceuticals: Efficacy, Safety, and Toxicity*, 53, 735-756. R.C. Gupta, Elsevier, Inc., London, UK.
30. D.R. Janero, A. Korde, **A. Makriyannis**, (2017), Ligand-Assisted Protein Structure (LAPS): An Experimental Paradigm for Characterizing Cannabinoid- Receptor Ligand-Binding Domains in *Methods in Enzymology: Cannabinoids and their Receptors*, **593** (10), 218-232. P.H. Reggio, Elsevier Inc., London, UK.
31. D.R. Janero, K. Vemuri, **A. Makriyannis**, (2019), The Molecular Basis of Cannabinoid Activity: Application to Therapeutics Design and Discovery for Cannabis Use Disorders in *Cannabis Use Disorders*, 43-55. I.D. Montoya, S.R.B. Weiss, Springer Nature, Cham, Switzerland.

## REVIEWS:

1. Mavromoustakos T., **A. Makriyannis**, (1993), The use of molecular graphics as an aid in the study of the conformational properties of biologically active molecules. *Rev. Clin. Pharmacol.*, **11**, 88-89.
2. Malan Jr. T.P., M.M. Ibrahim Jr., J. Lai, T.W. Vanderah, **A. Makriyannis**, F. Porreca, (2003), CB2 cannabinoid receptor agonists: Pain relief without psychoactive effects? *Curr. Opin. Pharmacol.*, **3**(1), 62-67. PMID: 12550743
3. Thakur G.A., S.P. Nikas, **A. Makriyannis**, (2005), CB1 cannabinoid receptor ligands. *Mini Rev. Med. Chem.*, **5**(7), 631-640. PMID: 16026309
4. Thakur G.A., S.P. Nikas, C. Li, **A. Makriyannis**, (2005), Structural requirements for cannabinoid receptor probes. *Handbook of Experimental Pharmacology*, (168), 209-246. PMID: 16596776
5. Lu D., V.K. Vemuri, R.I. Duclos Jr., **A. Makriyannis**, (2006), The cannabinergic system as a target for anti-inflammatory therapies. *Current Topics in Medicinal Chemistry*, **6**(13), 1401-1426. PMID: 16918457
6. Pavlopoulos S., G.A. Thakur, S.P. Nikas, **A. Makriyannis**, (2006), Cannabinoid receptors as therapeutic targets. *Curr. Pharm. Des.*, **12**(14), 1751-1769.
7. Thakur G.A., S.P. Nikas, R.I. Duclos Jr., **A. Makriyannis**, (2006), Methods for the synthesis of cannabinergic ligands. *Methods Mol. Med.*, **123**, 113-148.
8. Janero D.R., **A. Makriyannis**, (2009), Cannabinoid receptor antagonists: Pharmacological opportunities, clinical experience, and translational prognosis. *Expert Opin. Emerg. Drugs*, **14**(1), 43-65. PMID: 19249987
9. Janero D.R., S.K. Vadivel, **A. Makriyannis**, (2009), Pharmacotherapeutic modulation of the endocannabinoid signaling system in psychiatric disorders: Drug-discovery strategies. *Int. J. Psychiatry*, **21**(2), 122-133. PMID: 19367506 PMCID: PMC5531754

10. Kunos G., D. Osei-Hyiaman, S. Bátkai, K.A. Sharkey, **A. Makriyannis**, (2009), Should peripheral CB(1) cannabinoid receptors be selectively targeted for therapeutic gain? *Trends Pharmacol. Sci.*, **30**(1), 1-7. PMID: 19042036 PMCID: PMC2748782

#### ACTIVE RESEARCH FUNDING:

##### FEDERAL GRANTS (Active)

P01 DA009158 (PI = A. Makriyannis) (9/30/94-5/31/27), *Endocannabinoid Active Sites as Therapeutic Targets*

R13 DA040423 (PI = A. Makriyannis) (7/15/15-6/30/25), *Chemistry and Pharmacology of Drugs of Abuse Symposium*

R33 DA045882 (PI = A. Makriyannis) (9/30/18-7/31/24), *Antidotes for Acute Cannabinoid Intoxication*

R01 DK119498 (**Subaward PI** = A. Makriyannis) (7/1/19-6/30/24), *Gut-Brain Endocannabinoid Signaling in Feeding Behavior and Obesity*

R01 DA052271 (**Subaward PI** = A. Makriyannis) (7/1/20-5/31/25), *Targeting Inflammasome with Stable Endocannabinoid Ligand AMG315. CRISPR/Cas9 and Nanotechnology Study in the Context of HIV and Cannabinoid*

U01AA028963 (PI = A. Makriyannis) (9/20/20-8/31/25), *CB1 Neutral Antagonists for Alcohol Use Disorder*

U01AA028963-04S1 (PI = A. Makriyannis) (9/1/23-8/31/24), *CB1 Neutral Antagonists for Alcohol Use Disorder – Administrative Supplement*

DARPA HR0011-21-2-0027 (PI = A. Makriyannis) (11/1/21-9/29/24), *Structure-Guided Drug Discovery of Novel Modulators for Cannabinoid Receptors*

T32 DA055553 (PI = A. Makriyannis) (7/1/22-6/30/27), *Training Program on Development of Medications for Substance Use Disorder*

##### INDUSTRIAL GRANTS

Endo Pharmaceuticals, *CB2 Selective Agonists*

Glaxo Wellcome, *Design and Synthesis of Antineoplastic Alkyl Lysophospholipids*

Glaxo Wellcome, *Antineoplastic Ether Lipids Molecular Mechanisms of Action*

WHO, *World Health Organization Research Award*

Pfizer Central Research, *Development of Porcine Somatotropin Receptor Binding Assays*

#### INVITED LECTURES SINCE 1998:

1998

American Assoc. of Pharma. Scientists' Eastern Regional Meeting, Parsippany, NJ (**Keynote**)

Regional American Chemical Society Meeting, Middlebury, CT (**Keynote**)

Boston University, School of Medicine, Boston, MA

Virginia Commonwealth University NIDA Seminar Series, Richmond, VA

Last Updated 4/4/2024

National Neuroscience Meeting, Los Angeles, CA  
 Fudan University, Shanghai, China  
 College of Pharmacy, Second Military Medical University, Shanghai, China  
 Shanghai Institute of Organic Chemistry, Chinese Academy of Science, China  
 Institute of Materia Medica- Chinese Academy of Medicine, Shanghai, China  
 Qing Hua University, Shanghai, China  
 International Cannabinoid Research Society, Palais des Congres, La Grande Motte, France

## 1999

University of Cyprus, Nicosia, Cyprus  
 Boston University, School of Medicine, Boston, MA  
 8th Cyprus Conference on New Methods in Drug Research, Limassol, Cyprus  
 American Association of Pharmaceutical Scientists Annual Meeting, New Orleans, LA  
 FASEB Summer Research Conference, Copper Mountain, CO  
 2nd Annual BEACON SYMPOSIUM Drug Discovery, Design and Delivery Symposium (**Keynote**)  
 NIDA IRP Special Seminar, Bethesda, MD  
 American Chemical Society Regional Meeting, Boston, MA  
 University of Connecticut Health Center, Farmington, CT  
 Harvard Medical School-McLean Hospital, Belmont, MA

## 2000

RBI Sigma, Natick, MA  
 American Chemical Society National Meeting, San Francisco, CA  
 Yale Psychosis Research Seminar Series, New Haven, CT  
 University of Connecticut Health Center, Farmington, CT  
 University of Connecticut, Physiology and Neurobiology, Storrs, CT  
 Synaptic Pharmaceutical Corporation, Paramus, NJ  
 New Perspectives in the Therapeutic Uses of Endocannabinoids, Madrid, Spain  
 University of Minnesota, Minneapolis, MN  
 University of Connecticut, School of Pharmacy All-School Seminar Series, Storrs, CT  
 Pacificchem Joint American and Japanese Chemical Society 2000 Conference, Honolulu, HI

## 2001

Harvard Medical School-McLean Hospital, Belmont, MA  
 Wayne State University, Detroit, MI  
 University of Connecticut Chemistry Colloquium, Storrs, CT  
 Abbott Laboratories, Chicago, IL  
 American Chemical Society National Meeting, Chicago, IL  
 NIDA Symposium on Cannabinoids: Chemistry and Biology Meeting, Bethesda, MD  
 AstraZeneca R&D, Montreal, Canada

## 2002

National Institute of Mental Health, Bethesda, MD  
 Purdue University, Indianapolis, IN  
 University of Louisville, Louisville, KY  
 NIDA Symposium on Structural Biology & Structural Genomics/Proteomics, Bethesda, MD  
 International Behavioral Neuroscience Society 11th Annual Meeting, Capri, Italy  
 International Symposium on Medicinal Chemistry, Barcelona, Spain  
 Scientific Seminar Series at the University of Connecticut, Groton, CT  
 Mini-Symposium on Current Trends in Drug Abuse Research, Storrs, CT (**Keynote**)  
 American Association of Pharmaceutical Scientists Annual Meeting, Toronto, Ontario, Canada  
 Marine Sciences, University of Connecticut, Groton, CT

Center for Genetics and Molecular Medicine, University of Louisville, Louisville, KY

#### 2003

National Institute on Drug Abuse, Rockville, MD  
 Northeastern University, Boston, MA  
 University of Connecticut School of Pharmacy Advisory Board, Storrs, CT  
 American Society for Pharmacology and Experimental Therapeutics, San Diego, CA  
 Crompton Corporation Chapter of Sigma Xi, Middlebury, CT **(Keynote)**  
 NIDA's Southern Africa Initiative, Cape Town, South Africa  
 Center for Vascular Biology, University of Connecticut Health Center, Farmington, CT  
 National Hellenic Research Foundation, Athens, Greece **(Keynote)**  
 4th International Symposium on Pharmaceutical Chemistry, Istanbul, Turkey  
 Institute of Living Neuroscience Rounds, Hartford, CT

#### 2004

Virginia Commonwealth University, Richmond, VA  
 Signaling Lipids and Drugs of Abuse for the National Institute on Drug Abuse, Washington, D.C.  
 NIDA on Medications Development for Cannabis Dependence, Rockville, MD  
 National Institute on Drug Abuse and the American Psychiatric Association, New York, NY  
 10th Cyprus Conference on New Methods in Drug Research, Limassol, Cyprus  
 Meeting for the College on Problems of Drug Dependence (CPDD), San Juan, Puerto Rico  
 International Cannabinoid Research Society (ICRS) Satellite Meeting, Paestum, Italy  
 CMCR Conference: Future Directions in Cannabinoid Therapeutics, Paestum, Italy  
 American Chemical Society National Meeting, Philadelphia, PA  
 AAPS-NIDA Symposium, Bethesda, MD  
 Northeastern University, Boston, MA  
 Northeastern University, Massachusetts Council of Biotechnology, Boston, MA **(Keynote)**  
 1st Hellenic Symposium ORGANIC SYNTHESIS, U. of Athens, Greece **(Keynote)**  
 Institute of Montreal Pfizer Lecture Series, Montreal, Canada  
 NIDA for the American College of Neuropsychopharmacology, San Juan, Puerto Rico

#### 2005

Symposium Chair for the Center for Drug Discovery and Northeastern University, Boston, MA  
 Provost's Innovations in Research, Northeastern University, Boston, MA  
 Washington University, St. Louis, MO  
 15th Noordwijkerhout-Camerino Symposium, Amsterdam, Netherlands  
 Boehringer-Ingelheim Pharmaceutical, Ridgefield, CT  
 XV Annual International Cannabinoid Research Society Symposium, Clearwater, FL  
 Moderator for AAPS National Biotechnology Conference, San Francisco, CA  
 NIDA SPIRDAP Special Emphasis Panel, Bethesda, MD  
 Columbia University, Department of Medicine and Sanofi-Aventis, New York, NY  
 Panel Moderator and Presenter, ACNP Annual Meeting, Waikoloa, HI

#### 2006

NIDA, Bethesda, MD  
 ICRS 16th Annual Symposium on the Cannabinoids, Tihany, Hungary  
 GRASP, Northeastern University, Boston, MA **(Keynote)**  
 SBIR, Governor's Office of Workforce Competitiveness, East Hartford, CT **(Keynote)**

#### 2007

10th IBN Sina International Conference on Pure and Applied Heterocyclic Chemistry, Luxor, Egypt  
 The Threat of Obesity, Northeastern University, Boston, MA **(Keynote)**

Kenneth E. Avis Distinguished Visiting Professor Lecture, Memphis, TN **(Keynote)**  
 ASPET, Washington, D.C.  
 Camerino Lectures, Camerino, Italy  
 NU Today Event, Northeastern University, Boston, MA  
 American Chemical Society National Meeting, Boston, MA  
 NIDA/NIH, Rockville, MD  
 ECSN Scientific Forum, Boca Raton, FL

## 2008

Medications Development for Treatment of Cannabis-Related Disorders, NIDA/NIH, Bethesda, MD  
 National Hellenic Research Foundation, Athens, Greece **(Keynote)**  
 235th ACS Spring National Meeting and Burger Award, New Orleans, LA  
 American Society of Addiction Medicine, Toronto, Canada  
 11th Cyprus Conference on “New Methods in Drug Research”, Limassol, Cyprus  
 NU Board of Trustees Annual Corporation Faculty Symposium, Boston, MA **(Keynote)**

## 2009

University of Hawaii, Honolulu, HI  
 Northeastern University Pharmaceutical Sciences Showcase, Boston, MA **(Keynote)**  
 Northeastern University Chemistry and Chemical Biology Retreat, Boston, MA  
 National Institute of Health, Bethesda, MD  
 The College on Problems of Drug Dependence Special Symposium, Reno, NV  
 American Association of Colleges of Pharmacy, Boston, MA  
 Gordon Research Conference: Cannabinoid Function in the CNS, Biddeford, ME  
 Biogen Idec, Cambridge, MA

## 2010

Northeastern University, Special Topics in Chemistry, Boston, MA  
 COST Chemistry: Free Radicals in Chemical Biology, Athens, Greece **(Keynote)**  
 Alnylam Biotherapeutics, Cambridge, MA, March 2010  
 28th Camerino-Cyprus-Noordwijkerhout Symposium, Camerino, Italy  
 International Narcotics Research Conference, Malmö, Sweden  
 Beijing Institute of Meteria Medica, Chinese Academy of Medical Sciences, Beijing, China  
 International Symposium, Nanjing University, Nanjing, China **(Keynote)**  
 Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai, China  
 Fudan University, School of Pharmacy, Shanghai, China  
 Shanghai Institute of Organic Chemistry, Shanghai, China  
 Behavior, Biology, and Chemistry: Translational Research in Addiction, San Antonio, TX **(Keynote)**

## 2011

The Royal Danish Academy of Sciences and Letters, Copenhagen, Denmark  
 Philip S. Portoghese Symposium, University of Minnesota, Minneapolis, MN  
 Drug Discovery, Delivery & Development, Northeastern University, Boston, MA  
 12th Cyprus Conference on “New Methods in Drug Research”, Limassol, Cyprus  
 NIDA Training Grant Symposium, University of Kentucky, Lexington, KY  
 Northeastern University Pharmcal Sciences Research Showcase, Boston, MA  
 Behavior, Biology, and Chemistry: Translational Research in Addiction Conference, San Antonio, TX  
 Brigham and Women’s Hospital Presentation, Harvard University, Cambridge, MA

## 2012

Department of Pharmaceutical Sciences Seiminar, University of Pittsburgh, Pittsburgh, PA  
 18<sup>th</sup> Society on Neuroimmune Pharmacology Scientific Conference, Honolulu, HI



33<sup>rd</sup> National Medicinal Chemistry Symposium, University of Arizona, Tuscon, AZ  
 Arcade Conference on Chemistry for Health, Athens, Greece  
 The Foundation for Research and Technology- Hellas 30<sup>th</sup> Anniversary Celebration, Heraklion, Crete  
 Northeastern University Honors Special Topics in Health Care, Boston, MA  
 Northeastern University PRISM Lecture Series, Boston, MA

## 2013

Northeastern University Biophysical Methods in Drug Design, Boston, MA  
 Northeastern University Understanding Design Special Lectures Series, Boston, MA  
 University of Hawaii, Manoa Drug Design and Discovery, Honolulu, HI  
 TRP Colloquium, National Institute on Drug Abuse, Washington D.C.  
 Spice Colloquium, National Institute on Drug Abuse, Washington D.C.

## 2014

Northeastern University Biophysical Methods in Drug Design, Boston, MA  
 RTI, Durham, NC  
 Department of Medicinal Chemistry, Virginia Commonwealth University, Richmond, VA  
 McLean Hospital, Boston, MA  
 34<sup>th</sup> National Medicinal Chemistry Symposium, Charleston, SC  
 Medical Cannabis Symposium, Connecticut Pharmacists Association, Plantsville, CT **(Keynote)**  
 SupplySide West Conference, Las Vegas, NV  
 University of Hawaii, Manoa, Honolulu, HI  
 Beijing Biomedicine Summit, Beijing Biomedicine Forum, Beijing, China **(Keynote)**

## 2015

Northeastern University Biophysical Methods in Drug Design, Boston, MA  
 Northeastern University, Alumni Center Reception, Boston, MA  
 Beijing Biomedical Conference, Beijing, China **(Keynote)**  
 King Abdulaziz University, Jeddah, Saudi Arabia  
 Scientific Memorial, Dr. Steven Goldberg, NIDA Intramural Research Program, Baltimore, MD  
 ANPA Meeting, Orlando, FL  
 Hikewell Institute, Beijing, China **(Keynote)**  
 Nanjing University, Nanjing, China  
 University of Hawaii, Honolulu, HI  
 College on Problems of Drug Dependence, Phoenix, AZ  
 Northeastern University, New Provost Bear Orientation, Boston, MA  
 Northeastern University, Honors Special Topics in Healthcare, Boston, MA  
 King Faisal University, Al Ahsa, Saudi Arabia  
 International GPCR Meeting, iHuman Institute and ShanghaiTech University, Suzhou, China  
**(Keynote)**

## 2016

Keystone Symposia on Molecular and Cellular Biology. Keystone, CO  
 AOCS Annual Meeting and Expo, Salt Lake City, UT **(Keynote)**  
 MassBio Formulations and Drug Discovery Forum, Cambridge, MA **(Keynote)**  
 Pain Mechanism and Therapeutics Conference, Taormina, Sicily  
 P30 CDAR EAB Meeting, Pittsburgh, PA **(Keynote)**  
 17<sup>th</sup> Annual ADDF Meeting, Jersey City, NJ

## 2017

Applied Pharmaceutical Chemistry 2017 at The Broad Institute, Cambridge, MA  
 CannMed 2017 Conference, Harvard Medical School, Cambridge, MA

ASPET Annual Meeting at Experimental Biology 2017, Chicago, IL  
 Institute of Cannabis Research Conference, Pueblo, CO **(Keynote)**  
 UCONN Seminar Series, Storrs, CT  
 ICRS 2017, Montreal, QC Canada  
 2017 Drugs of Abuse Conference, Boston, MA **(Keynote)**  
 American Chemical Society Symposium of the MEDI Division, Bethesda, MD  
 ADDF 18th International Conference on Alzheimer's Drug Discovery, Jersey City, NJ  
 Boston Veteran Affairs (VA) Healthcare System seminar Series, Boston, MA **(Keynote)**  
 4th Annual Personalized NanoMedicine 2017, Miami, FL

## 2018

Mount Sinai Pharmacological Sciences Seminar Series, New York, NY  
 Pain Mechanisms and Therapeutics Conference, Taormina, Sicily Italy  
 The College on Problems of Drug Dependence, INC. 80<sup>th</sup> Annual Scientific Meeting, San Diego, CA  
 256<sup>th</sup> American Chemical Society Meeting and Exposition, Boston, MA **(Keynote)**  
 Johns Hopkins University Department of Psychiatry and Behavioral Sciences, Baltimore, MD  
 Novel Analgesic Drug Discovery Summit 2018, Boston, MA  
 24<sup>th</sup> Biotechnology Congress: Research & Innovations, Boston, MA  
 British Pharmacological Society- Molecular Pharmacology of GPCRs Meeting, Parkville, Australia

## 2019

NECANN Boston, Boston, MA  
 Wertheim Lectureship Series, Miami, FL  
 University of Arizona Minisymposium on Neurobiology, Tucson, AZ  
 12<sup>th</sup> Chicago Symposium on Translational Neuroscience, Chicago, IL  
 8<sup>th</sup> WHBA Summer School in Medical and Bio-sciences Research, Mani, Greece **(Keynote)**  
 ICRS 2019, Bethesda, MD **(Keynote)**  
 International Cannabinoid Derived Pharmaceuticals Summit, Boston, MA  
 Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, St. Petersburg, FL  
 Drug Discovery Meeting 2019, Boston, MA

## 2020

Cowen's 40th Annual Health Care Conference, Boston, MA  
 International Cannabinoid Derived Pharmaceuticals Summit 2020, Virtual  
 Inaugural Cannabinoid Discovery Symposium, Virtual **(Keynote)**

## 2021

University of Athens, Athens, Greece

## 2022

University of Athens, Athens, Greece

## 2023

Florida International University Nair Lab, Miami, FL  
 University of Hawaii, Manoa Drug Design and Discovery, Honolulu, HI **(Keynote)**  
 University of Athens, Athens, Greece

## 2024

6<sup>th</sup> International Conference on PharmScience R+D, Newton, MA  
 TD Cowen's 44<sup>th</sup> Annual Health Care Conference, Boston, MA

**MENTORING ACTIVITIES:**

*Graduate, Post-Doctoral Fellows, and Visiting Scholars Directly Advised Since 2000 (University of Connecticut and Northeastern University, partial list)*

1. X. Tian, Ph.D., 1993-2004; Postdoctoral, 2004-2011
2. D. Lu, Ph.D., 1994-2005; Postdoctoral, 2005-2006
3. H.F. Deng, M.Sc., Ph.D., 1995-2000
4. R. Picone, Ph.D., 1995-2001; Postdoctoral, 2002-2004
5. J. Guo, Ph.D., 1996-2003; Postdoctoral, 2004-2006
6. T. Kourouli, Visiting Scholar (Greece), 1996-2001
7. X.Z. Lai, Ph.D., 1996-2004
8. Q. Liu, M.Sc., 1996-2002
9. R. Chari, Ph.D., 1998-2005
10. A. Ramamurthy, M.Sc., 1998-2001
11. S. Nikas, Postdoctoral, 1999-2003
12. S. Palmer, Postdoctoral, 1999-2002
13. A.K. Singh, M.Sc., 1999-2001
14. M. Sommer, Postdoctoral, 1999-2000
15. C. Souli, Postdoctoral, 1999-2000
16. F.M. Yao, Postdoctoral, 1999-2001
17. Y. Zhuang, Postdoctoral, 1999-2001
18. A. Zvonok, Postdoctoral, 1999-2002
19. H. Hu, Postdoctoral, 2000-2001
20. R. Mercier, Postdoctoral, 2000-2006
21. T. Neelands, Postdoctoral, 2000-2001
22. G. Thakur, Postdoctoral, 2000-2003
23. W. Xu, Ph.D., 2000-2006
24. J. Anday, Ph.D., 2001-2006
25. P. Fan, Visiting Scholar (China), 2001-2007; 2009-2010; 2011-2014
26. S. Filppula, Postdoctoral, 2001-2006
27. Y.C. Leung, Postdoctoral, 2001-2004
28. C. Li, M.Sc., 2001-2004
29. P. McLaughlin, Postdoctoral, 2001-2005
30. C.R. Ramanathan, Postdoctoral, 2001-2004
31. R. Thotapally, Postdoctoral, 2001-2004
32. K. Winston, Ph.D., 2001-2006
33. S. Yaddanapudi, Ph.D., 2001-2007
34. G. Choi, Postdoctoral, 2002-2004
35. D. Kazolias, M.Sc., 2002-2005
36. L. Pandarinathan, Postdoctoral, 2002-2003
37. Y. Pei, Ph.D., 2002-2007
38. C. Rajan, M.Sc., 2002-2005
39. J. Wood, Postdoctoral, 2002-2005
40. J. Zhao, M.Sc., 2002-2005
41. L. Bizeta, Postdoctoral, 2003-2004
42. D. Fortin, Ph.D., 2003-2006
43. T. Olszewska, Postdoctoral, 2003-2005
44. Y. Peng, M.Sc., 2003-2007; 2008-2009
45. K.V. Subramanian, Postdoctoral, 2003-2005
46. S. Varadarajan, Postdoctoral, 2003-2004
47. V. Veerappan, Postdoctoral, 2003-2004
48. J. Zhang, M.Sc., 2003-2006
49. O.S. Alapafuja, Ph.D., 2004-2009
50. C. Haile, Postdoctoral, 2004-2005
51. K.R. Vemuri, Postdoctoral, 2004-2007
52. J. Williams, Ph.D., 2004-2007
53. S. Divakaramenon, Postdoctoral, 2005-2007
54. K. Dzenko, Postdoctoral, 2005-2006
55. P. Holmberg, Postdoctoral, 2005-2006
56. E. Jutkiewicz, Postdoctoral, 2005-2006
57. D. Karanian, Postdoctoral, 2005-2007
58. T. Parkkari, Visiting Scholar (Finland), 2005-2007
59. J. Zhai, Postdoctoral, 2005-2006
60. W. Aizu, Postdoctoral, 2006-2007
61. X. Han, Visiting Scholar (China), 2006-2007
62. M. Johnston, Ph.D., 2006-2011
63. I. Karageorgos, Ph.D., 2006-2011
64. A. Kastal, M.Sc., 2006-2009
65. V. Magriotti, Visiting Scholar (Greece), 2006
66. P.W. Qin, M.Sc., 2006-2008
67. P. Salgaonkar, Postdoctoral, 2006-2007
68. R. Sharma, Ph.D., 2006-2011; Postdoctoral, 2011
69. E. Shelnut, Ph.D., 2006-2011
70. V. Shukla, Postdoctoral, 2006-2009
71. D. Szymanski, Ph.D., 2006-2011
72. L. Song, Postdoctoral, 2006-2007
73. H. Teng, Ph.D., 2006-2011
74. J. Zhuang, Postdoctoral, 2006-2009
75. D. Anagnostopoulos, Visiting Scholar (Greece), 2007
76. S. Bajaj, Ph.D., 2007-2012
77. A. Bowman, Postdoctoral, 2007-2009
78. S. Cararas, Postdoctoral, 2007-2008
79. F. Desarnaud, Postdoctoral, 2007
80. M. D'Souza, Ph.D., 2007-2011
81. C. Freni, M.Sc., 2007-2008
82. S. Gopalakrishnan, M.Sc., 2007-2008
83. H. Jang, Postdoctoral, 2007

84. C. Kearn, Postdoctoral, 2007-2008
85. I. Kendrick, Ph.D., 2007-2011
86. P. LeBeaume, Ph.D., 2007-2010
87. H. Li, Postdoctoral, 2007-2009
88. M. Papanastasiou, Postdoctoral, 2007-2010
89. S. Tai, Ph.D., 2007-2012
90. N. Telang, Postdoctoral, 2007-2008
91. S. Tyukhtenko, Postdoctoral, 2007-2010
92. P. Yin, Ph.D., 2007
93. H. Zhou, Ph.D., 2007-2014; Postdoctoral, 2014-2016
94. V. Kodumuru, Postdoctoral, 2008-2010
95. S. Marathe, M.Sc., 2008-2009
96. M. Nasr, Ph.D., 2008-2012
97. A. Rafalko, Ph.D., 2008-2011
98. A. Sallum, Postdoctoral, 2008-2009
99. S. Sanghavi, M.Sc., 2008-2009
100. R. Serbanescu, M.Sc., 2008-2010
101. D. Smith, Postdoctoral, 2008-2010
102. R. Tichkule, Ph.D., 2008-2012
103. K. Whitten, Ph.D., 2008-2012
104. S. Bhatt, M.Sc., 2009-2010
105. S.H. Chalasani, M.Sc., 2009-2010
106. D. Finnegan, Postdoctoral, 2009-2011
107. M. Johnson, Ph.D., 2009-2014
108. K. Melchior, Postdoctoral, 2009-2010
109. C. Mushti, Postdoctoral, 2009-2010
110. B. Patel, M.Sc., 2009-2010
111. J. West, Postdoctoral, 2009-2013
112. J. Garcia, Postdoctoral, 2010-2013
113. S. Ganguly, M.Sc., 2010-2011
114. C. Habrukowich, Postdoctoral, 2010-2014
115. Y. Jmeian, Postdoctoral, 2010
116. A. Kulkarni, M.Sc., 2010-2011
117. G. Rajarshi, Ph.D., 2010-2017
118. F. Sekyere, Ph.D., 2010
119. L. Shen, Postdoctoral, 2010-2011
120. B. Zhang, Postdoctoral, 2010-2011
121. D. DeFilippo, M.Sc., 2011-2012
122. A. Korde, Ph.D., 2011-2017
123. Y. Liu, Postdoctoral, 2011-2015
124. M. Williams, Postdoctoral, 2011-2014
125. D. Ambrosini, Postdoctoral, 2012-2015
126. M. Baradwan, Ph.D., 2012-2023
127. D. Felsing, Ph.D., 2012-2016
128. C. Honrao, Ph.D., 2012-2019
129. S. Kulkarni, Ph.D., 2012-2016
130. S. Mallipeddi, Ph.D., 2012-2016
131. C. Miyabe, Ph.D., 2012-2018
132. M. Silva, Ph.D., 2012-2013
133. R. Vemula, Postdoctoral, 2012-2014
134. T. Yu, Ph.D., 2012-2018
135. W. Zhang, M.Sc., 2012-2014; Ph.D., 2014-2017
136. S. Jiang, Ph.D., 2013-2019
137. B. Kochert, Ph.D., 2013-2018
138. M. McCormack, Postdoctoral, 2013-2015
139. D. Pelekoudas, M.Sc., 2013-2015; Ph.D., 2015-2020
140. B. Peng, M.Sc., 2013-2014; Ph.D., 2014-2016
141. C. Perry, Ph.D., 2013-2016
142. J. Raghav, M.Sc., 2013-2014; Ph.D., 2014-
143. P. Raje, M.Sc., 2013-2014
144. W. Zhu, M.Sc., 2013-2014
145. C. Honrao, Ph.D., 2014-2019
146. S. Jiang, Ph.D., 2014-2019
147. Y. Liu, Ph.D., 2014-2020
148. X. Ma, M.Sc., 2014; Ph.D., 2015-2022
149. K. Mohammad, Ph.D., 2014-2019
150. X. Sun, Ph.D., 2014-2016
151. B. Suchomel, M.Sc., 2014
152. W. Wang, M.Sc., 2014-2015
153. B. Wong, M.Sc., 2014
154. L. Fleischer, Ph.D., 2015-2022
155. L. Ji, Ph.D., 2015-2020
156. M. Lamani, Postdoctoral, 2015-2020
157. A. Casey, Ph.D., 2016-2021
158. D. Gazgalis, Ph.D., 2016-2018
159. C. Iliopoulos-Tsoutsouvas, Ph.D., 2016-2021; Postdoctoral, 2021-2023
160. O. Benchama, Ph.D., 2017-2021; Postdoctoral, 2021
161. X. Chen, M.Sc., 2017-2018
162. S. Farah, Ph.D., 2017-2021
163. E. Smith, Ph.D., 2017-
164. D. AlKhelb, Ph.D., 2018-2023
165. T. Ho, Postdoctoral, 2018-2023
166. E. Solakidou, Visiting Scholar, 2018-2020; Ph.D., 2020-
167. M. Speziale, Ph.D., 2018-
168. F. Tong, Ph.D., 2018-2023
169. N. Tran, M.Sc., 2018-2020; Ph.D., 2020-
170. M. Georgiadis, Ph.D., 2019-
171. M. Gerasi, Ph.D., 2019-
172. S. Hilston, Ph.D., 2019-
173. S. Erdman, Ph.D., 2021-
174. J. Gruberg, Ph.D., 2021
175. A. Sheikh, Ph.D., 2021-
176. S. Kulkarni, Ph.D., 2022
177. H. Li, Ph.D., 2022-
178. D. Morrisson, Ph.D., 2022-
179. V. Val, Ph.D., 2022
180. M. Agne, Ph.D., 2023

181. K. Brown, Ph.D., 2023-  
 182. J. Famiglietti, Ph.D., 2023-  
 183. S. Karnik, Ph.D., 2023-  
 184. H. Patel, MBA, 2024-

185. D. Vedpathak, MBA, 2024-

#### MINORITY ACTIVITIES:

Majority-Minority Interactive Research Program; Collaboration between the University of Connecticut, Florida A&M University; Special Summer Internship Program; NIDA Sponsored Collaboration with North Carolina A&T University (NCAT); Member, External Scientific Advisory Committee of the Minority Biomedical Research Program at NIH, Florida A&M; NIH Special Populations Research Development Effort

#### MINORITY INDIVIDUALS ADVISED SINCE 2000:

<b>Student</b>	<b>University Attended</b>	<b>Dates Sponsored</b>
Mufeed Basti	North Carolina A&T Associate Professor	Summers 2000, 2001, 2003, 2004
Carl Engmann	University of Connecticut Undergraduate Student	Summer 2000
Sonya Palmer	University of Connecticut Post Doctoral Fellow	2000-2003
Keisha Winston	University of Connecticut Graduate Student	2001-2005
Jenine Anday	University of Connecticut Graduate Student	2001-2007
Shakiru Alapafuja	Northeastern University Doctoral Student	2006-2008
Sherrica Tai	Northeastern University Graduate Student	2007-2011
Elvis Tiburu	Northeastern University Assistant Research Professor	2007-2013
Joseph Allen	Northeastern University Undergraduate Student	2009-2014
Jessica Garcia	Northeastern University Post Doctoral Fellow	2010-2013
Christina Miyabe	Northeastern University Graduate Student	2012-2018
Murillo Silva	Northeastern University Graduate Student	2012-2013
Othman Benchama	Northeastern University Graduate Student	2017-2021

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