

ARISTOTLE G. KALIVRETENOS
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CAREER SUMMARY:

- Expertise in solution/solid-phase synthetic organic chemistry; methodology and total synthesis
- Supervisory and Project Management experience
- Product Development and Commercialization Experience (**G-Mark** and **Si-HOBt** products)
- Track record of innovative accomplishment
 - Patents (6 issued, 5 pending)
 - Publications (18 in print; peer reviewed articles and book chapters)
 - Presentations (14 invited, 18 contributed)
- Experience with FDA and OSHA compliance requirements

EDUCATION:

- Ph.D.** Colorado State University; Organic Chemistry **1990**
- **Dissertation:** “Synthesis of Macrolides via Organopalladium Chemistry. Application to the Synthesis of Zearalenone”
 - **Research Advisors:** Prof. John K. Stille and Prof. Louis S. Hegedus
- B.S.** Clemson University, Chemistry, *summa cum laude*. **1985**

PROFESSIONAL EXPERIENCE:

- AURORA ANALYTICS, LLC** **2004 - present**
Chief Operating Officer, Co-Founder
- Launched **Si-HOBt** product line
 - Launched **G-Mark** glucuronide and sulfate alcohol diagnostic standard product line
 - Development of food quality indicator products
 - Contract Chemical Synthesis and Analytical services

COLLEGE OF NOTRE DAME OF MARYLAND, BALTIMORE, MD **2005 – 2008**

Adjunct Professor of Chemistry

- **Teaching efforts:** Organic Chemistry and Laboratory in the Accelerated College for the B.S. Nursing Program

SENSORS FOR MEDICINE AND SCIENCE, INC., GERMANTOWN, MD **1998 – 2004**

Scientist 1998 - 1999

- Design, synthesis and characterization of novel fluorescent chemosensors for glucose recognition

Scientist II 1999 - 2004

- Design, synthesis and characterization of novel fluorescent chemosensors for glucose recognition
- Directed organic chemistry and sensor validation work
- Conducted literature and patent searches
- Developed protocols for FDA compliance requirements

Safety Officer 2001 - 2004

- Maintained chemical inventory
- Developed protocols for OSHA compliance requirements

PARAGON BIOTECH, INC., BALTIMORE, MD 1998

Consultant

- Design of antiangiogenic target molecules

UNIV OF MARYLAND BALTIMORE COUNTY, BALTIMORE, MD 1992– present

Assistant Professor of Chemistry 1992 - 1998

- **Research efforts:** bioorganic studies of channel forming peptides; solution and solid-phase protein/peptide/amine modification technology; preparation of heterocyclic compounds.
- **Teaching efforts:** Introductory Organic Chemistry; Organic Reaction Mechanisms; Organic Synthetic Methodology; Total Synthesis of Natural Products; Ion Channels of Excitable Membranes

Adjunct Assistant Professor of Chemistry 1998 – present

- **Teaching efforts:** General Chemistry

UNILEVER RESEARCH, U.S., EDGEWATER, NJ 1991 – 1992

Synthetic Consultant

- Developed strategies for the synthesis of radiolabeled compounds.

COLUMBIA UNIVERSITY, NEW YORK, NY 1990 – 1992

Post-doctoral Research Scientist (Research Advisor: Prof. Koji Nakanishi)

- Synthetic and bioorganic studies of Philanthotoxin (PhTX) in neuronal receptor systems.

TECHNICAL SKILLS:

- **Synthetic techniques:** solid-phase and solution-phase organic synthesis, automated and manual solid-phase peptide synthesis, polymer synthesis/modification and radiosynthesis (^3H and ^{125}I)

- **Polymer techniques:** hydrophobic and hydrogel polymer synthesis and modification; molecular imprinted polymer design and synthesis
- **Chromatographic techniques:** TLC, LC, HPLC (including maintenance and repair), GPC
- **Spectroscopic techniques:** FT-IR, ¹H, ¹³C and ³¹P NMR, UV-VIS, fluorescence, MS

HONORS RECEIVED:

- Researcher for Sinai Hospital of Baltimore (1997-1998), American Heart Assoc., MD Affiliate
- NIH Post-doctoral Fellowship (1991)
- Synaptic Corporation Post-doctoral Fellowship (1991)
- Syntex Award for Excellence in Organic Chemistry, Colorado State University (1987)
- Colorado State Graduate Fellowship (1985)
- Michelin Undergraduate Grant for Study in France, Clemson University (1985)

PROFESSIONAL ACTIVITIES:

Membership

- American Chemical Society, Division of Organic Chemistry

Editor

- *Chemical Highlights*, Columbia University, 1991-1992

Activities at Conferences

- Session Chair, 17th International Symposium on the Separation of Proteins, Peptides and Polynucleotides, Rockville, MD, October 26-29, 1997.

PATENTS: (6 issued, 5 pending)

- “Butyryl-Tyrosinyl Spermine, Analogs thereof and Methods of Preparing and Using Same” Koji Nakanishi, Danwen Huang, Soek-Ki Choi, Aristotle Kalivretenos and Robert Goodnow, **US Patent # 6,001,824**, December 14, 1999.
- “Detection of Analytes by Fluorescent Lanthanide Metal Chelate Complexes Containing Substituted Ligands” Arthur E. Colvin, George Y. Daniloff, Aristotle G. Kalivretenos, David Parker, Edwin E. Ullman and Alexandre V. Nikolaitchik, **US Patent # 6,344,360**, February 5, 2002.
- “Detection of glucose in solutions also containing an alpha-hydroxy acid or a beta-diketone” George Y. Daniloff, Aristotle G. Kalivretenos, and Alexandre V. Nikolaitchik, **US Patent # 6,800,451**, October 5, 2004.
- “Detection of glucose in solutions also containing an alpha-hydroxy acid or a beta-diketone” George Y. Daniloff, Aristotle G. Kalivretenos, and Alexandre V. Nikolaitchik, **US Patent # 7,078,554**, July 18, 2006.
- “Amine detection method and materials” Aristotle G. Kalivretenos, **US Patent # 7,229,835**, June 12, 2007.
- “Amine detection method and materials” Aristotle G. Kalivretenos, **US Patent # 7,592,183**, September 22, 2009.

- “Nitric Oxide Releasing Polymers” Aristotle G. Kalivretenos, Robert E. Raulli, Blaine G. Doletski and Ernst V. Arnold, **US Published Application # 20070196327**, filed December 5, 2006.
- “Amine detection method and materials” Aristotle G. Kalivretenos, **US Published Application # 20100010167**, filed September 21, 2009.
- “Molecularly-imprinted polymeric materials for visual detection of explosives” Aristotle G. Kalivretenos, Kelly A. Van Houten, Jonathan P. Gluckman, Frank M. Hardy, Igor P. Dorovskoy, Robert Trower, **US Published Application # 20120184044**, filed December 30, 2009.
- “Compounds, polymers and methods for treating gastrointestinal dysfunction” Aristotle G. Kalivretenos, Robert E. Raulli, Niaz Sahibzada, Richard Gillis, Mark S. Niedringhaus, **US Published Application # 20100255062**, filed June 14, 2010.
- “Amine detection method and materials” Aristotle G. Kalivretenos, **US Published Application # 20120184683**, filed January 20, 2012.

PUBLICATIONS: (18 in print)

Articles

- "Elemental Carbon and Lead Content of Fine Particles from American and French Cities of Comparable Size and Industry, 1985." Delumyea, R. Del; Kalivretenos, A. *Atmospheric Environment* **1987**, *21*, 1643-1647.
- "Determination of the Fe²⁺/Fe³⁺ Ratio in Nuclear Waste Glass" Hawkes, A.E.; Brewer, K.M.; Brock, N.A.; Hunter, T.R.; Edge, M.; Kalivretenos, A.; Fanning, J.C. *Journal of the American Ceramic Society* **1989**, *72*, 943-947.
- "Synthesis of β -Resorcylic Macrolides via Organopalladium Chemistry. Application to the Total Synthesis of (*S*)-Zearalenone" Kalivretenos, A. G.; Stille, J. K.; Hegedus, L. S. *J. Org. Chem.* **1991**, *56*, 2883-2894.
- "Synthesis of Novel and Photolabile Philanthotoxin analogs" Choi, S.-K.; Goodnow, R.; Kalivretenos, A.; Chiles, G. W.; Fushiya, S.; Nakanishi, K. *Tetrahedron* **1992**, *48*, 4793-4822.
- "Synthesis of Philanthotoxin Analogs with a Branched Polyamine Moiety" Kalivretenos, A.; Nakanishi, K. *J. Org. Chem.* **1993**, *58*, 6596.
- "Bioorganic studies of transmitter receptors with philanthotoxin analogs" Nakanishi, K.; Choi, S.-K.; Hwang, D.; Lerro, K.; Orlando, M.; Kalivretenos, A.G.; Eldefrawi, A.; Eldefrawi, M.; Usherwood, P.N.R. *Pure & Appl. Chem.* **1994** *66*, 671.
- "Labeling Studies of photolabile philanthotoxins with nicotinic acetylcholine receptors: mode of interaction between toxin and receptor" Choi, S.-K.; Kalivretenos, A.G.; Usherwood, P.N.R.; Nakanishi, K. *Chemistry & Biology* **1995**, *2*, 23.
- "Lactams as Heterodienophiles in Diels-Alder Chemistry" Degnan, A.P.; Kim, C.S.; Stout, C.W.; Kalivretenos, A.G. *J. Org. Chem.* **1995**, *60*, 7724.
- "Synthesis of Medium Ring Lactams Via Cyclization Reactions Using Polymer Bound HOBt as Catalyst" Huang, W., Kalivretenos, A.G. *Tetrahedron Lett.* **1995**, *36*(50), 9113.
- "Tetrameric Peptide Bundles Via A Highly Convergent Synthesis" Hirsch, J.; Huang, W.; Kalivretenos, A.G. *Biopolymers* **1996**, *39*, 761-763.

- "Synthesis of N-Hydroxysuccinimide Esters Using Polymer Bound HOBt" Dendrinis, K.; Kalivretenos, A. G. *Tetrahedron Lett.*, **1998**, 39, 1321-1324.
- "HOBt immobilized on macroporous polystyrene beads: a useful reagent for the synthesis of amides" Dendrinis, K.G.; Jeong, J.; Huang, W.; Kalivretenos *Chem. Commun.*, **1998**, 499-500.
- "Convenient Protection of Amines as Carbamates Using Polymer Bound HOBt" Dendrinis, K.; Kalivretenos, A. G. *Perkins Trans. I.* **1998**, 1463-1464.
- "Synthesis and Separation of Hydrophobic Peptides for Use in Biomimetic Ion Channels" Kassim, S.Y.; Restrepo, I.M.; Kalivretenos, A.G., *J. Chromatogr. A*, **1998** 816, 11-20.
- "Synthesis of Amide Libraries with Immobilized HOBt" Vokkaliga, S.; Jeong, J.; LaCourse, W.; Kalivretenos, A. *Tetrahedron Lett.*, **2011**, 52, 2722-2724.
- "Engineering a Hyper-catalytic Enzyme by Photoactivated Conformation Modulation" Agarwal, P.K.; Schultz, C.; Kalivretenos, A.; Ghosh, B.; Broedel, S.E. *J. Phys. Chem. Lett.* **2011**, 3, 1142-1146.

Chapters in Books

- "Synthetic and Bioorganic Studies with Philanthotoxin Analogs" Nakanishi, K.; Goodnow, R.; Kalivretenos, A.; Choi, S.-K.; Fushiya, S.; Chiles, G.; Eldefrawi, A.; Eldefrawi, M.; Usherwood, P. *"New Leads and Targets in Drug Research"*, Alfred Benzon Symp. 33, Krogsgaard-Larsen, P.; BrÅgger Christensen, S.; Kofod, H., eds., Munksgaard, Copenhagen, **1992**, 138-148.
- "Philanthotoxin-433 and analogs, noncompetitive antagonists of glutamate and nicotinic acetylcholine receptors" Chiles, G.; Choi, S.-K.; Eldefrawi, A.; Eldefrawi, M.; Fushiya, S.; Goodnow, Jr., R.; Kalivretenos, A.; Nakanishi, K.; Usherwood, P. In *Neurotox '91: Molecular Basis of Drug and Pesticide Action"* Duce, I.R., ed., Elsevier Applied Science, London, **1992**, 3-17.

PRESENTATIONS: (14 invited, 18 contributed)

Invited Papers

- "Bioorganic Studies of Philanthotoxin Analogs", Synaptic Corporation, Paramus, New Jersey, July, 1992.
- "Total Synthesis of (S)-Zearalenone; Bioorganic Studies of Philanthotoxin Analogues", Dept. of Chemistry and Biochemistry, UMBC, November, 1992.
- "Approaches to the Study of Ion Transport Across Excitable Membranes Through the Use of Ion Channel Models", Scios Nova Inc., Dundalk, Maryland, February 1994.
- "Ion Channels: From Biology to Biosensors" Dept. of Chemistry and Biochemistry, UMBC, November 21, 1994.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Biological Chemistry, UMAB, Baltimore, MD, February 5, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Chemistry, Western Maryland College, Westminster, MD, February 9, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Biology, UMBC, Baltimore, MD, March 13, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Transcell Technologies, Inc., Monmouth Junction, NJ, May 23, 1996.

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