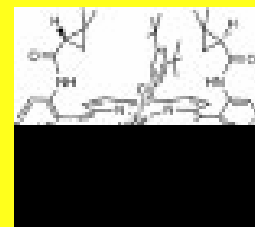
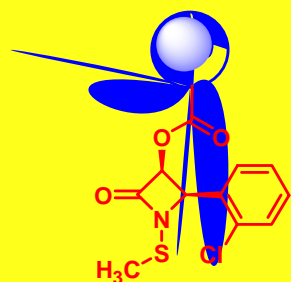
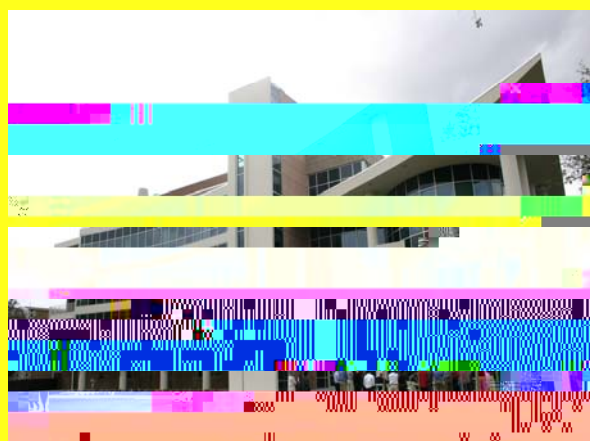


CMD⁵: Center for Molecular Diversity in Drug Design science and education in the di

iscovery, design, synthesis and development of structurally diverse biologically-relevant molecules and drug delivery modes for the prevention and cure of human diseases



CMD⁵ Areas of Investigation

Drug synthesis and delivery
Alzheimers/Parkinsons drugs
Synthetic methodologies
Bioanalytical methods
Nanoparticle antibiotics
Protein synthesis
Bioassay development

Antibiotics and anticancer agents
Natural products
Nutraceutical R&D
Biopolymer design and synthesis
Computational drug design
Bio-NMR and mass spectrometry
High-throughput biotesting

Recent CMD⁵ Highlights

- A central component of USF's Florida Center of Excellence proposal for Biomolecular Identification and Therapeutic Therapy (BITT), which has been ranked 1st out of 32 applications submitted
- Eight faculty researchers have been hired since 2001 (including one joint with Moffitt) in cognate drug discovery areas such as organic synthesis, medicinal chemistry, molecular modeling, biophysical chemistry and biochemistry
- New research labs in Natural and Environmental Sciences (NES) and Chemistry (CHE) buildings are equipped with state-of-the-art mass spectroscopy, nuclear magnetic resonance, and protein synthesis core facilities, which are managed by Ph.D.-level directors
- Increase in the number of Ph.D. students studying drug discovery to about 50
- Development of a 5-year BS/MS degree in drug discovery
- Numerous research publications and patent applications in the past 3 years
- \$5 million in external funding from National Science Foundation and National Institute for Health in past 3 years
- A wide variety of ongoing collaborations with a number of major pharmaceutical companies and outside academic labs
- Creation of a spin-out company (Nanopharma Technologies) in the USF small business incubator

CMD⁵ Researchers and Their Interests

Organic Synthesis

Ed Tuross, Ph.D. (Professor of Chemistry, Director of CMD⁵)

Our lab focuses on the synthesis and evaluation of new antibacterial and anticancer agents, as well as development of nanoparticle polymers as drug delivery vehicles and biomedical plastics. His research group does both synthetic methods development and microbiological studies on new antibiotics and nanoparticles for drug delivery, collaborating with a number of groups at USF. He is also a co-founder and chief scientific advisor of Nanopharma Technologies, Inc., a research and development spin-out company located in the USF research park.

Mark L. McLaughlin, Ph.D. (Professor of Chemistry and Interdisciplinary Oncology)

Our lab is investigating: short highly helical amphipathic peptides with direct and indirect antimicrobial activity and anticancer activity and constrained dipeptides that enforce an extended conformation for use in the synthesis of stable beta-sheet-like peptide structures with applications to age-related disease such as Alzheimer's and Parkinson's disease. We are developing a new class of HIV protease inhibitors based on easily synthesized constrained dipeptide-like units using a structure-based approach.

Kirpal Bisht, Ph.D. (Associate Professor of Chemistry)

Our group focuses on efficient and environmentally friendly synthetic routes towards synthesis of polymers for biodegradable applications, as well as stereocontrolled synthesis/modification of molecules that serve as precursors to

Jon Antilla, Ph.D. (Assistant Professor of Chemistry)

The Antilla lab has developed numerous synthetically interesting transformations whereby chiral Brønsted acids can act as effective organocatalysts. This new approach to catalysis allows for the general synthesis of various highly desired chiral heterocycles. We have also initiated a project whereby guanidine analogues are prepared by new synthetic methods for subsequent in vitro and in vivo studies for potential as anti-stroke therapeutics by collaborators in the USF College of Medicine.

Natural Products

Bill Baker, Ph.D. (Professor of Chemistry)

The Baker lab investigates various aspects of natural products chemistry, including the biosynthesis of alkaloids in Floridian tunicates, chemical ecology of shallow-water Antarctic marine invertebrates, chemotherapeutic agents from marine invertebrates, natural products from marine microorganisms, as well as the synthesis, semi-synthesis and lead optimization of bioactive marine natural products.

Jun Tan, M.D., Ph.D. and R Douglas Shytle, Ph.D.

Our labs have both preclinical and clinical R&D experience, and we

Biochemistry

David Merkler, Ph.D. (Professor of Chemistry)

Our lab conducts research on peptidylglycine α -amidating enzyme and other enzymes catalyzing post-translational modifications of proteins and peptides, such as tyrosylprotein sulfotransferase, acyl-CoA:g



Bioassay Development

Dennis Kyle, Ph.D. (Professor of Global Health)

The Kyle laboratory focuses on discovery, lead optimization, and development of drugs for the treatment of malaria and leishmaniasis. Dr. Kyle formerly led the Drug Discovery and Lead Optimization programs at the Walter Reed Army Institute of Research. His new lab at USF is housed in the Interdisciplinary Research Building located in the Research Park, and conducts in vitro and in vivo models for evaluating antiparasitic drugs. In addition, the Kyle lab uses cell, molecular, and chemical biology approaches to understand antimalarial drug resistance mechanisms.



Alberto van Olphen, D.V.M., Ph.D. (Assistant Professor of Global health)

Dr. van Olphen is the Director of the Virology Core of the USF-Center for Biological Defense (CBD) located in the USF research park. Research activities of the van Olphen lab include the development of new molecular and immunological diagnostics, drug screening for antiviral drugs and characterization of drug resistance for viral agents with bioterrorist potential and emerging viral diseases. A. van Olphen has established collaborations with faculty at the USF Chemistry Department working in the identification and characterization of natural products and pure compounds with antiviral capacity. Dr. van Olphen is also a member of the Global Health Infectious Disease Research (GHIDR) program.

John Adams, Ph.D. (Professor of Global Health)



Instrumental Core Facilities

Ted Gauthier, Ph.D. (Research Assistant Professor of Chemistry, Director of the Mass Spectrometry and Peptide Synthesis Core Facility). The *USF Peptide and Mass Spectrometry Facility* supports the research efforts of a variety of scientific disciplines from engineering to drug discovery. The facility is supporting the scientific community at USF by providing state-of-the-art instrumentation, training, scientific and technical support, and education. Currently, I am involved in two research areas. The first is the development of a new HIV protease inhibitor with Dr. Mark McLaughlin (Chemistry). The second is an interdisciplinary effort with Drs. Jun (COM) and Shytle (COM) to use mass spectrometry to determine the pharmacokinetics of EGCG in biological systems.

