Community of Researchers in Chemistry at Lehman College

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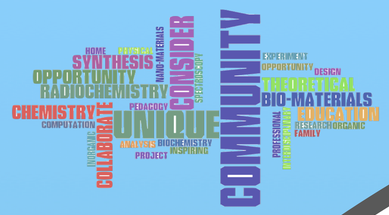

Chemical Education & Radiochemistry

Melissa Deri
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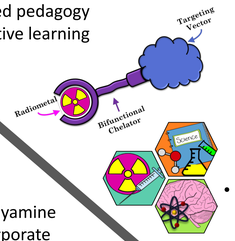
Chemical Education
Finding effective teaching practices and strategies:
- Use of technology in education
- Online learning tools
- Flipped pedagogy
- Active learning



Radiochemical Drug Design
The integration and application of radiochemistry towards tangible benefits to society. Specifically, the intersection of radiochemistry and biomedical science in molecular imaging and radiotherapy using radioactive metals:
- Bifunctional chelator development
  - Radiometal chelation studies
  - Radiopharmaceutical design

NIH

Organic & Polymer

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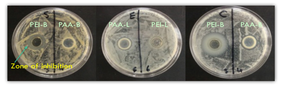
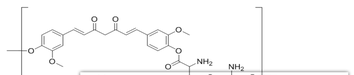
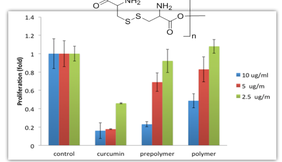
Antimicrobial materials
Developed facile synthetic method for preparing polysaccharide-polyamine hybrid hydrogels. Currently exploring modifying polyamines to incorporate antimicrobial properties for their eventual use in hydrogels.







Curcumin polymers
Developing biodegradable curcumin polymers with anti-cancer activity. Currently developing hydrogels utilizing these materials as implantable therapeutics.

Wound Healing with hydrogels
Studying how hydrogel composition affects wound healing. Novel hydrogels are projected to positively affect the wound healing process without the use of additives such as growth factors, which are commonly used to aid the healing process.

Computational Physical Chemistry

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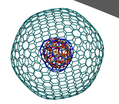
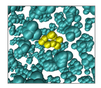
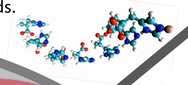


Study of systems where quantum mechanical contributions are of paramount importance using computational techniques.
Path integral Monte Carlo techniques coupled to empirical potentials are used to take into account nuclear quantum delocalization, and obtain thermodynamic properties. For systems of finite size, density functional theory is used to solve electronic problems and obtain structural and temperature independent properties. 3 current projects include:
- the quantum description of pure fluids which show a liquid-liquid phase transition
- the confinement of molecular hydrogen inside fullerenes
- the formation of proton wires using amino acids.





Materials & Inorganic

Andrei Jitianu
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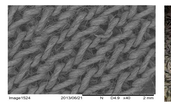
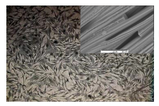
Bone regeneration in collaboration with France and NYU: Developing new "band-aid", bandages based on carbon tissue – hydroxyapatite composites for bone regeneration.

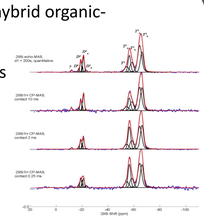
SEM image of the carbon tissue-hydroxiapatite composite



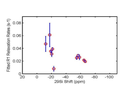


(2X magnification) of the osteoblast cells after 168 hours of growing on the carbon tissue coated with hydroxyapatite (in the insert)

Anticorrosive Hermetic Barriers in collaboration with Spain: Melting gels are hybrid organic-inorganic materials that can act as anticorrosive hermetic barriers for air space industry, electronics and microelectronics. These are supposed to replace the anticorrosive electrochemical treatments with Cr(VI). The presence of Cr(VI) has become a public safety issue in the last years due to the fact that this is one of the main causes of breast cancer.



The $^{29}Si\{^{1}H\}$- NMR spectra recorded at room temperature of the melting gel with composition 75%MTES-25%DMDES. The melting gel have a wide range of molecular species composition but the predominant molecular species are the trimers T^3.



Radiochemistry
Synthesis
Labelling
Imaging

Biomaterials
Molecular probes
Self assembly
Drug design

CHEMISTRY

Chemical Education
Flipped classroom
Online education
Outreach

Computational
Condensed matter
Drug design
Assembly

Chemical Education & Inorganic Structure and Function

Donna McGregor
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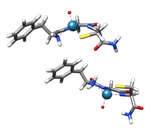
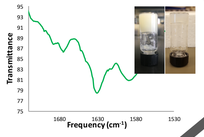
Using amino acids as building blocks for short complex structures
Intelligent design of short peptide sequences as metal-chelating cores to model the binding of d-block metals in radiotherapuetic drug design and for the development of new proton transfer materials





Chemical Education

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Adding a chapter on chemical education to your research repertoire?
Join us for an immersive experience in education:
- The mentoring relationship
- Metacognition and soft skills
- Flipped Classrooms and active learning

Computer Aided Drug Design & Theoretical Chemistry

Tom Kurtzman
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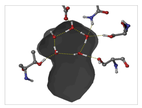
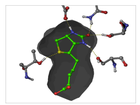
How do drugs interact with their protein targets?
Utilizing statistical mechanical theory and computer simulations to investigate the physical principles that govern the molecule recognition between small molecule drugs and their protein targets. The knowledge gained from these studies is then used to develop computational methodologies tools that facilitate the discovery and design of new drugs. A particular emphasis is placed on the role that water plays in the molecular recognition process.

www.lehman.edu/faculty/tkurtzman





Analytical Chemistry and Chemical Biology

Prabodhika Mallikaratchy
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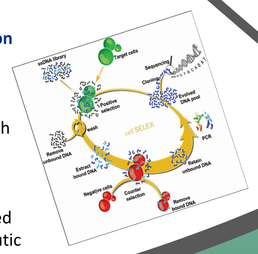
Can we design a synthetic antibody mimetic based on DNA aptamers against cancer?
Develop oligonucleotide aptamer based synthetic antibodies for biological and biomedical applications. We utilize combinatorial chemistry in conjugation with biochemical techniques to evolve target specific DNA aptamers. We are particularly interested in development of new methods of aptamer selection. The selected aptamers are then chemically engineered and converted into immunogenic agents for therapeutic investigations.



Macromolecular & Environmental Radiochemistry

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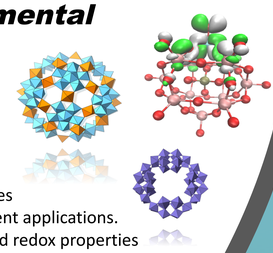
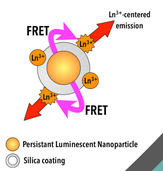


The nuclear fuel cycle and metal oxides:
- The fundamental behavior of d- and f-block radiometals within metal oxides and metal clusters to improve separations and to discover new radioelement applications.
- The effect of coordination environment on the photophysical, chemical and redox properties of metal ions.

Persistently Luminescent Lanthanide Constructs:
The fluorescence of persistently luminescent molecules is re-purposed for the development of radioimaging/therapy techniques. Specifically, the synthesis and characterization of cyclen-based molecules incorporating lanthanide ions and the detection of their luminescent signals in solution and solid state.



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All research projects in the department are funded by the agencies above

http://www.lehman.edu/academics/chemistry