

NANOSCALE SCIENCE AND TECHNOLOGY OF BIOMOLECULAR INTERACTIONS AT ARTIFICIAL INTERFACES

American or foreign individuals holding or about to receive a bachelor or master degree are invited to consider studies towards the PhD degree in Biomedical Sciences at Auburn University. The electronic application form for fall 2008 may be obtained at:

https://fp.auburn.edu/gradschl/public_html/GWAAP3/default.htm

PhD Graduate Assistantships will be awarded on a competitive basis as described at:

http://www.vetmed.auburn.edu/uploads/images/4817/2008_ORGS_assistantships.pdf

The Nanoscale Science and Technology program's facilities include Dr. Vainrub's laboratory that focuses on understanding and design of advanced nanostructured biointerfaces. The laboratory is particularly interested in surfaces functionalized by biopolymers for sensor array and amplification applications. Electrostatic and entropic interfacial effects are used to control and optimize the biomolecular binding thermodynamics and kinetics. Studied systems include surface attached DNA probes where the interface electrostatic mechanism [1,2] and probe surface density effects [3] were demonstrated to dominate the DNA double helix formation and stability. Thermodynamic theory of DNA microarrays has been developed [4,5] and validated by experiments [6] in collaboration with the microarray industry. Ongoing projects on electronic DNA biochips and isothermal PCR are based on findings generated within our group. Future studies will include protein arrays, use of imaging ellipsometry and FTIR spectroscopy for label-free detection. Research is supported by and coordinated with the Detection and Food Safety Center (<http://audfs.eng.auburn.edu>) with applications in biodetection, agriculture, veterinary medicine, and human health.

Candidates interested in joining the Vainrub laboratory must have completed coursework and laboratory training in physics and/or chemistry, desirably with specialization in biosciences or bioengineering. Experience with applied optics and/or surface chemistry is helpful. For further information and reprints of the publications, please contact:

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2. Vainrub A and Pettitt BM. (2003) Biopolymers 68:265-270.
3. Vainrub A and Pettitt BM. (2002) Phys Rev E 66:41951-41954.
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6. Vainrub A, Deluge N, Zhang X, Zhou X, and Gao X. (2007). In: Methods in Molecular Biology, vol. 382: Microarrays, editor J.B. Rampal, vol. 2, pp. 393-403, Humana Press, Totowa, NJ.