



DIPARTIMENTO DI FARMACIA E BIOTECNOLOGIE

## **AVVISO DI SEMINARIO**

**Il giorno lunedì 23 Maggio 2022  
alle ore 10.00**

*in streaming:*

<https://teams.microsoft.com/join/19%3aN09c0NlyEssBnF7ObCyDOQwkgDWM1qdd9f7F2nJV9fw1%40thread.tacv2/1631519544944?context=%7b%22Tid%22%3a%22e99647dc-1b08-454a-bf8c-699181b389ab%22%2c%22Oid%22%3a%225a941351-ef41-4aa4-8771-fa50a6d62ca1%22%7d>

*oppure in presenza:*

**Aula 2, Via Belmeloro 6, Bologna**

**Dott. James P. Vesenka**

University of New England, Biddeford, ME, USA  
(ospite Dott. Zuccheri)

terrà un seminario dal titolo:

## **AFM ANALYSIS OF G-WIRE DNA STRUCTURE AND NANOPARTICLE DECORATION**

Collegli e studenti sono cordialmente invitati

*Commissione Ricerca e Attività Correlate - FaBiT*

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## ABSTRACT

Atomic force microscopy was used to characterize extended quadruplex DNA structures (G-wires) constructed from three different oligo building blocks adsorbed on two different substrate preparations. G-wires adsorbed onto freshly cleaved mica through magnesium cation bridge have a preferential orientation at  $60^\circ$  intervals after rinsing and drying, a characteristic of equilibrated adsorption. These present a high degree of auto-orientation even after as little as 10 minutes of incubation, indicating rapid equilibration with the atomic structure of the mica surface. G-wires kinetically trapped onto amino acid treated-mica provide information regarding the flexibility of the G-wires in bulk solution. Persistence length measurements indicate that G-wire flexibility about five times less than that of double stranded DNA. Progress in gold nanoparticle decorating of branched G-wires will be discussed.

## BIOGRAPHICAL SKETCH



He graduated Magna Cum Laude and Phi Beta Kappa from Clark University with a dual major in chemistry and physics in 1982. He graduated with a M.Sc. and Ph.D in physics, with an emphasis in biological physics, from the University of California, Davis in 1989. Dr. Vesenka's post-doctoral training included research at the Institute for Molecular Biology and Signal Transduction Training Group at Iowa State University. He published nearly 50 articles and received patents for developing the scanning probe microscope (SPM) for use in high resolution imaging of biomolecules and developing techniques to reconstruct true surface topography due to probe artifacts. Dr. Vesenka was an assistant professor in the Department of Physics at California State University Fresno (CSUF) in 1995, continuing his four-stranded DNA research and establishing a California State University-wide scanning probe microscopy facility. He began teaching general physics and continuing both lines of research at the University of New England in 2000. Dr. Vesenka has received funding from the Research Corporation and National Science Foundation to set up scanning probe microscopy facilities at CSUF and UNE. His recent undergraduate research examined the auto-orientation of the self-assembled four-stranded DNA on the surface of phyllosilicates. Recently, he initiated a new collaboration with Bigelow Ocean Labs to undertake near-field characterization of iron-oxidizing bacteria. All of Dr. Vesenka's 17 graduated research assistants have gone on to professional schools, primarily to study medicine. He also has used the SPM in conjunction with the modern physics component of the introductory physics lab to image atoms in real time as models for quantum mechanics in action.