

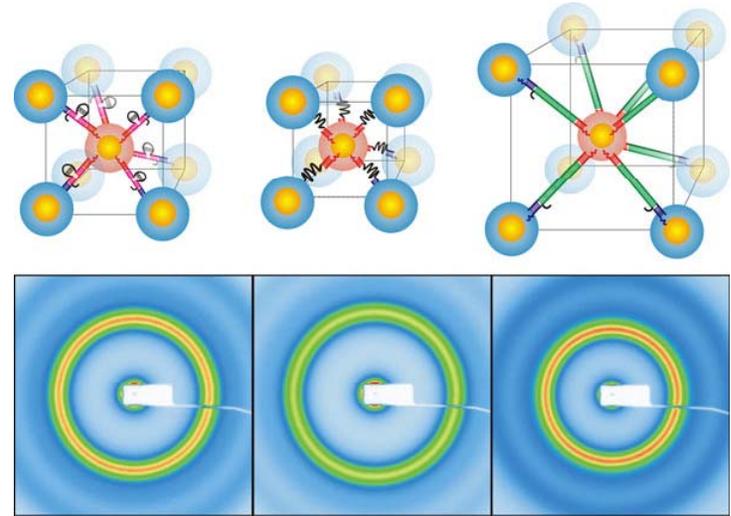
Soft Matter & Biological Physics Research Community (Village)

Researcher	Institution	Department
Alessandro Cunsolo	BNL	PSD
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Andrei Fluerasu	BNL	PSD
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Masa Fukuto	BNL	CMPMS
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Researcher	Institution	Department
Allen Orville	BNL	Biology
Chang-Jun Liu	BNL	Biology
Oleg Gang	BNL	CFN
Dmytro Nykypanchuk	BNL	CFN
Kevin Yager	BNL	CFN
Dan Fischer	NIST	Synch Group
Christian Burger	SBU	Chemistry
Ben Chu	SBU	Chemistry
Ben Hsiao	SBU	Chemistry
Tadanori Koga	SBU	Mat Sci & Eng
Miriam Rafailovich	SBU	Mat Sci & Eng
Helmut Strey	SBU	Biomed Eng

Soft Matter & Biological Physics: Research Focus and Relevance

- ***Study a wide range of organic materials***
liquids, liquid crystals, macromolecules, linear and branched polymers, polymer blends, block copolymers, elastomers, colloids, functionalized nanoparticles or nanorods, nanocomposites, gels, biomembranes, polyelectrolytes, proteins, metalloenzymes, and biominerals.
- ***Research relevant for***
 - ***Energy*** – higher efficiency photovoltaics, batteries, microelectronics, fuel cells, biofuels
 - ***Environmental sustainability*** – greener processing methods
 - ***Clean water*** – nanofiber purification membranes
 - ***National security*** – higher strength, flame retardant materials, marine antifouling agents
 - ***Health*** – drug delivery, tissue engineering



Soft Matter & Biological Physics: Challenges & Technique Advances

- ***Research and technological challenges include***
 - Characterize complex hierarchical structures that order on multiple length scales.
 - Direct self-assembly by nanopatterning, by functionalization, or electrostatically.
 - Determine materials response to deformation and behavior under nanoconfinement.
 - Optimize materials for operation under extreme conditions (temperature & pressure).
 - Measure membrane or fluid dynamics and correlate to biological or chemical function.
 - Develop green processing protocols for organic films that optimize their properties.
 - Control kinetic & thermodynamic pathways to stabilize novel intermediate structures.
- ***Technique advances under development***
 - High throughput microfluidics X-ray scattering set-ups.
 - Droplet microfluidics device for mRNA extraction and analysis.
 - Serial micro-crystallography with acoustic droplet ejection methods.
 - Novel coherent soft X-ray optics.
 - Algorithms for image reconstruction.
 - Methodologies for high-resolution X-ray diffraction microscopy.

Soft Matter & Biological Physics NSLS-II Beamlines

NSLS-II Beamline	Techniques	Source	Status
Scattering and Diffraction Beamlines			
Soft Matter Interfaces (SMI)	Micro-GISAXS, GID, XR, SAXS-WAXS	Und	NEXT
Soft Matter Interfaces (SMI-2)	Liquid Reflectometer	Und	NEXT
Complex Materials Scattering (CMS)	High Throughput SAXS-WAXS, USAXS, XR	3PW	NxtGen
Coherent Hard X-rays (CHX)	XPCS, Coherent XRD, CDI	Und	Project
X-ray Scatt Instrument for Bio Apps (LiX)	Microbeam SAXS-WAXS, GISAXS, GID	Und	NIH
In-Situ Resonant Scattering (ISR)	Resonant Scatt, High-Q Res Surface Scatt	Und	NEXT
Coherent Soft X-ray (CSX)	Soft X-ray Resonant Scattering & CDI	Und	Project
Spectroscopy Beamlines			
Soft & Tender X-ray Spect Mat Sci (SST)	NEXAFS, XPS: FF microscopes, amb pressure	Und	NIST
Inelastic X-ray Scattering (IXS)	Hard X-ray, High Res, IXS	Und	Project
Imaging Beamlines			
Coherent Diffraction Imaging (CDI)	Hard X-ray in-line CDI, Bragg CDI	Und	Approved
Soft X-ray Spectromicros Mat Sci (SMF)	Soft X-ray STXM	Und	New
Scanning Transmission X-ray Micro (STX)	Soft X-ray STXM	Bend	New

CFN as an NSLS-II Partner User Facility

NSLS CU Endstation Program □ NSLS-II PUF Endstation Program	NSLS Beamline	NSLS-II Beamline
Biological and Soft Nanomaterials (Kevin Yager)		
Micro-GISAXS, GID, SAXS, WAXS, XR, Resonant Scattering	X9	SMI (NEXT)
High-throughput GISAXS, SAXS, WAXS, automation	X6B (pending)	CMS (NxtGen)
Interface Science and Catalysis (Jurek Sadowski, David Starr)		
LEEM- XPEEM (aberration corrected XPEEM at NSLS-II)	U5UA	ESM (NEXT)
Ambient Pressure – Photoemission Spectroscopy (scanning at NSLS-II)	X1A1	ESM (NEXT)
Electron Microscopy (Eric Stach)		
Operando XAS and aberration corrected TEM	NA	XEM (New)
Electronic Nanomaterials (Chuck Black)		
X-ray Interference Lithography	NA	XIL (Not App)