

Nick Gnedin

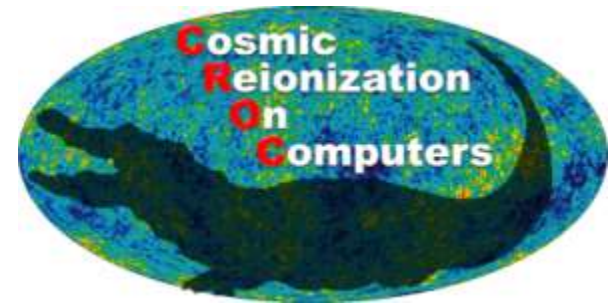
- 1992-1994 PhD Princeton
- 1994-1996 Postdoc jointly Princeton+MIT
- 1996-1998 Postdoc UC Berkeley
- 1998-2005 Assistant Prof, U. of Colorado
- 2005- Fermilab, UChicago (part-time faculty)

Research specialty:

- Cosmological simulations of all flavors: from individual galaxies to large cosmological volumes

Recent Scientific Interests

- “Reionization” (early structure formation)
 - The whole range of physics: ionization of intergalactic gas, early galaxy formation, effects of dark matter physics including annihilation, 21cm emission at high redshift, effects on the CMB.
 - Cosmic Reionization On Computers” – the leading reionization modeling project at the moment: 120 Mpc boxes with 100 pc resolution.



Recent Scientific Interests

- Effect of baryonic physics on structure formation
 - Weak lensing systematics and how to mitigate it (effect on the matter power spectrum, *intrinsic alignment*).
 - Structure of dark matter halos with baryons (*cusps vs cores, streaming velocity, filtering mass, emphasis on high redshift*).
- “Dive-in” simulations: physics of star formation and interstellar medium, Active Galactic Nuclei (AGN), cosmic rays.
- Lyman-alpha forest (less recent).

Recent Technical Interests

- Exa-scale revolution is coming. Next generation of supercomputers will require the next generation of codes to run of them.
 - Exploring novel simulation technology (*run-time systems, task parallelism, local time-stepping, GPU programming*).
 - Inventing new algorithms (“Optically Thin Variable Eddington Tensor” (OTVET) method for radiative transfer, “Hierarchical Particle Mesh” (HPM) method for gravity).