

BALŠA TERZIĆ

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NICADD, Department of Physics
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CITIZENSHIP: Montenegrin and Serbian
(US permanent resident)

EDUCATION

1995 – 2002 Florida State University, Tallahassee, Florida
Ph.D., Applied Mathematics
Supervisor: Professor Christopher Hunter
Thesis title: ‘*Scale-free Models of Triaxial Elliptical Galaxies With Central Cusps*’

1992 – 1995 Liberty University, Lynchburg, Virginia
B.S., Mathematics and Computer Science
Summa Cum Laude
Honors Program

PRIZES, SCHOLARSHIPS AND AWARDS

2000 Dissertation Research Grant, Florida State University
1995 Summa Cum Laude, Liberty University
1995 Most Outstanding Mathematics Student, Liberty University
1995 Most Outstanding Computer Science Student, Liberty University
1994 – 1995 National Dean’s List
1992 – 1995 Honors Program, Liberty University (graduated with highest honors)
1992 – 1995 Honors Scholarship, Liberty University
1992 – 1995 International Scholarship, Liberty University

PROFESSIONAL EXPERIENCE

2007 – Full Member of the Graduate Faculty
Beam Physics and Astrophysics Group, NICADD
Department of Physics, Northern Illinois University

- *Designed and implemented algorithms for simulation of coherent synchrotron radiation in charged-particle beams.*
- *Studied numerical noise and its removal from particle-in-cell beam simulations.*
- *Designed and implemented adaptive-grid wavelet-based particle-in-cell N-body code for use both in the context of charged particle beams and self-gravitating systems.*
- *Employed complementary theoretical modeling methods to constrain profiles of dark matter halos in dwarf spheroidal and dwarf elliptical galaxies.*
- *Supervised masters thesis work for two physics graduate students and chaired their graduate committees.*
- *Taught a graduate course in astrophysics and cosmology.*
- *Taught a portion of a graduate course in statistical physics.*

- 2006 – 2007 Research Scientist (with Professor Courtlandt Bohn)
 Beam Physics and Astrophysics Group, NICADD
 Department of Physics, Northern Illinois University
- *Worked on solving Vlasov-Poisson equation, appropriate for focused charged particle beam and a self-gravitating system, in an appropriately chosen orthogonal basis of functions.*
 - *Developed a new family of realistic triaxial density-potential-force profiles for stellar systems appropriate for describing bulges in spiral galaxies, dark matter halos, dwarf elliptical galaxies, and both ordinary and giant elliptical galaxies, optimized for efficient orbital integration.*
 - *Taught a portion of an undergraduate course in astrophysics.*
- 2004 – 2006 Research Associate (with Professor Courtlandt Bohn)
 Beam Physics and Astrophysics Group, NICADD
 Department of Physics, Northern Illinois University
- *Designed and implemented a new three-dimensional wavelet-based solver for the Poisson equation with Dirichlet boundary conditions, optimized for use in particle-in-cell simulations of charged particle beams.*
 - *Developed a new density-potential pair for spherical stellar systems appropriate for describing bulges in spiral galaxies, dark matter halos, dwarf elliptical galaxies, and both ordinary and giant elliptical galaxies, including galaxies with depleted cores.*
 - *Used techniques from nonparametric function estimation theory to develop new empirical models for dark matter halos.*
- 2002 – 2004 Postdoctoral Research Associate (with Professor Henry Kandrup)
 Gravitational Astrophysics Group
 Department of Astronomy, University of Florida
- *Applied tools of differential geometry to the study of chaotic dynamical systems. Studied applicability of statistical, differential-geometric approach to chaos in low-degree-of-freedom dynamical systems.*
 - *Conducted research on manifestations of chaos in time-dependent Hamiltonian systems and their implications for violent relaxation in the early Universe.*
 - *Investigated dynamical implications of close supermassive black hole binaries both as an example of resonant phase mixing and as a potential explanation of inversions and other anomalous features observed in the luminosity profiles of some elliptical galaxies.*
- 2002 Adjunct Faculty Member
 Department of Mathematics, Florida State University
- *Assisted in teaching a distance-learning upper-level undergraduate Discrete Mathematics course.*
- 2001 – 2002 Graduate Teaching Assistant
 Department of Mathematics, Florida State University
- *Taught a course Calculus & Analytic Geometry required for undergraduate degrees in sciences and mathematics.*
 - *Directed study sessions, reviews and examinations for a computer-aided freshmen-level course in basic college mathematics.*
- 2000 Visiting Researcher (with Professor Tim de Zeeuw)
 Sterrewacht Leiden, Leiden University, Netherlands
- *Collaborated with Tim de Zeeuw and the members of his Dynamical Astronomy Group on building analytical models of self-consistent triaxial galaxies using separable potentials.*
- 1997 – 2001 Graduate Research Assistant (with Professor Christopher Hunter)
 Department of Mathematics, Florida State University

- *Worked on a variety of problems in galactic dynamics:*
 - *bifurcations and stability of orbits in axisymmetric scale-free potentials*
 - *manifestations of chaos in triaxial galactic potentials*
 - *differential-geometric approach to studying chaos*
 - *self-consistent modeling of galactic systems using the Schwarzschild method*
 - *self-consistent modeling of galactic systems using separable potentials*
 - *recovering orbits using Lie transform perturbation method*
- 1996 – 1997 Graduate Systems Administration Assistant
Department of Mathematics, Florida State University
- *Maintained functionality of departmental computer resources running on UNIX, Windows and Mac platforms.*
 - *Served as a webmaster for the Florida State University Department of Mathematics and its Virtual Mathematics Library.*
- 1995 – 1996 Graduate Teaching Assistant
Department of Mathematics, Florida State University
- *Directed study sessions, examinations, and assisted in teaching an undergraduate freshmen-level mathematics course.*
- 1995 Computer Programmer (college internship)
First Colony Life Insurance, Lynchburg, Virginia
- *Programmed in C and SQL to implement a user interface software to query a large database containing customer insurance information.*
- 1992 – 1995 Computer Laboratory Tutor and Assistant
Liberty University
- *Tutored students in a number of programming languages (C, Fortran, Basic, Pascal, assembler, Lisp, Prolog) and software packages (MS Word, Excell, WordPerfect).*
 - *Assisted in maintaining functionality of computer resources.*

GRADUATE STUDENTS SUPERVISED

Edward Nissen	Advisor	MS, 2007	Physics	Northern Illinois University
“Chaos and Its Role in Emittance Growth in Fixed Field Alternating Gradient Accelerators”				
Benjamin Sprague	Advisor	MS, 2008	Physics	Northern Illinois University
“Wavelet-Space Solution to the Poisson Equation: An Algorithm For Use in Paricle-In-Cell Simulations”				
Awarded Midwestern Association of Graduate Schools Masters Thesis Award 2008				
Matthew Wiesner	Advisor	MS	Physics	Northern Illinois University
Dan Grubb	Advisor	PhD	Physics	Northern Illinois University
Janardan Pokharel	Advisor	PhD	Physics	Northern Illinois University

COURSES TAUGHT

Cosmology (directed reading)	PHYS 659	Spring 2009	Northern Illinois University
Astrophysics	PHYS 652	Spring 2008	Northern Illinois University
Statistical Physics (portion)	PHYS 563	Spring 2007	Northern Illinois University
Astrophysics (portion)	PHYS 477	Spring 2006	Northern Illinois University
Discrete Mathematics (distance-learning)	MAD 3107	Summer 2002	Florida State University
Calculus 1	MAC 2311	Spring 2002	Florida State University

REFEREED PUBLICATIONS

1. “Realistic Triaxial Density-Potential-Force Profile for Stellar Systems and Dark Matter Halos”
B. Terzić and B. Sprague 2007.
Monthly Notices of the Royal Astronomical Society 377, 855.
<http://arxiv.org/abs/astro-ph/0702595>
2. “Particle-in-Cell Beam Dynamics Simulations with a Wavelet-based Poisson Solver”
B. Terzić, I. Pogorelov and C. Bohn 2006.
Physical Review Special Topics: Accelerators and Beams 10, 034201.
http://www.nicadd.niu.edu/research/beams/STAB_TPB2007.pdf
3. “Improved Simulations of Photoinjectors for High Average Current Free Electron Lasers”
C. Bohn, D. Mihalcea, I. Sideris, I. Pogorelov and **B. Terzić** 2006.
Journal of Directed Energy 2, 162.
<http://www.nicadd.niu.edu/research/beams/JDE.pdf>
4. “Empirical Models of Dark Matter Halos. I. Model Comparison”
D. Merritt, A. Graham, B. Moore, J. Diemand and **B. Terzić** 2006.
Astronomical Journal 132, 2685.
<http://arxiv.org/abs/astro-ph/0509417>
5. “Empirical Models of Dark Matter Halos. II. Inner Profile Slopes, Dynamical Profiles, and ρ_e/σ^3 ”
A. Graham, D. Merritt, B. Moore, J. Diemand and **B. Terzić** 2006.
Astronomical Journal 132, 2701.
<http://arxiv.org/abs/astro-ph/0603613>
6. “Empirical Models of Dark Matter Halos. III. The Kormendy Relation and the $\log \rho_e - \log R_e$ Relation”
A. Graham, D. Merritt, B. Moore, J. Diemand and **B. Terzić** 2006.
Astronomical Journal 132, 2711.
<http://arxiv.org/abs/astro-ph/0608614>
7. “Density-Potential Pairs for Spherical Stellar Systems with Sérsic Light-Profiles and (Optional) Power-Law Cores”
B. Terzić and A. Graham 2005.
Monthly Notices of the Royal Astronomical Society 362, 197.
<http://arxiv.org/abs/astro-ph/0506192>
8. “Orbital Structure in Oscillating Galactic Potentials”
B. Terzić and H. Kandrup 2004.
Monthly Notices of the Royal Astronomical Society 347, 957.
<http://arxiv.org/abs/astro-ph/0306323>
9. “Supermassive Black Hole Binaries as Galactic Blenders”
H. Kandrup, I. Sideris, **B. Terzić** and C. Bohn 2003.
Astrophysical Journal 597, 111.
<http://arxiv.org/abs/astro-ph/0303173>
10. “Semi-analytic Estimates of Lyapunov Exponents in Lower-Dimensional Systems”
B. Terzić and H. Kandrup 2003.
Physics Letters A 311/2-3, 165.
<http://arxiv.org/abs/astro-ph/0211248>

CONFERENCE PROCEEDINGS

1. “Density Estimation Techniques for Charged Particle Beams With Applications to Microbunching”
G. Bassi and **B. Terzić** 2009.
Proceedings of the Particle Accelerator Conference 2009.
http://www.nicadd.niu.edu/~bterzic/Research/Bassi_Terzic.pdf

2. “Multiresolution Simulations of Photoinjectors”
D. Mihalcea, C. Bohn and **B. Terzić** 2006.
Proceedings of the 12th Advanced Accelerator Concepts Workshop.
http://www.nicadd.niu.edu/research/beams/aac06_wavelet.pdf
3. “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations”
B. Terzić, I. Pogorelov, D. Mihalcea and C. Bohn 2005.
Proceedings of the Particle Accelerator Conference 2005.
<http://www.nicadd.niu.edu/research/beams/TPAT039.pdf>
3. “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations”
B. Terzić and I. Pogorelov 2005.
Annals of the New York Academy of Sciences 1045, 55.
http://www.nicadd.niu.edu/research/beams/Terzic_Pogorelov_color.pdf
4. “Triaxial Galaxy Models With Separable Potentials”
B. Terzić, C. Hunter and P.T. de Zeeuw 2001.
In *Stellar Dynamics: From Classic to Modern*, eds. L. P. Ossipkov and I. I. Nikiforov,
St. Petersburg State University: Sobolev Astronomical Institute, page 303.
<http://www.math.fsu.edu/~aluffi/archive/paper126.ps.gz>
5. “Irregular Period Tripling Bifurcations in Axisymmetric Scale-free Potentials”
B. Terzić 1998.
Annals of the New York Academy of Sciences 867, 85.
<http://www.math.fsu.edu/~aluffi/archive/paper87.ps.gz>
6. “Bifurcations of Periodic Orbits in Axisymmetric Scale-free Potentials”
C. Hunter, **B. Terzić**, A. Burns, D. Porchia and C. Zink 1998.
Annals of the New York Academy of Sciences 867, 61.

SEMINARS, COLLOQUIA, TALKS AND CONFERENCE CONTRIBUTIONS

- “Density Estimation Techniques for Charged Particle Beams With Applications to Microbunching” – poster presentation
G. Bassi and **B. Terzić**. Particle Accelerator Conference, Vancouver, 2009.
- “Density Estimation Techniques For Charged Particle Beams” – seminar
B. Terzić. Cockcroft Institute, UK 2009.
- “Orthogonal Basis Functions Approximations of Particle Distributions in Numerical Simulations of Beams” – seminar
B. Terzić. CASA Beam Seminar, Jefferson Lab 2008.
- “Particle-in-Cell Beam Dynamics for Use in Particle-in-Cell Simulations” – seminar
B. Terzić. Department of Mathematics, University of New Mexico, 2006.
- “Application of Wavelets to N -body Particle-In-Cell Simulations”
B. Terzić. Department of Physics, Northern Illinois University, 2006.
- “Applying Multiscale Methodology to Beam Simulations” – invited talk
B. Terzić. Nanobeam Workshop, Kyoto, Japan, 2005.
- “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations” – talk
B. Terzić. High Power Superconducting Linacs Workshop, Naperville, 2005.
- “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations” – poster presentation
B. Terzić, I. Pogorelov, D. Mihalcea and C. Bohn. Particle Accelerator Conference, Knoxville, 2005.
- “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations” – seminar
B. Terzić and I. Pogorelov. Department of Mathematics, Virginia Tech, 2005.

- “Wavelet-based Poisson Solver for Use in Particle-in-Cell Simulations” – talk
B. Terzić. “Nonlinear Dynamics in Astronomy and Astrophysics” workshop, University of Florida, 2004.
- “Supermassive Black Hole Binaries as Galactic Blenders” – colloquium
B. Terzić. Department of Physics, Northern Illinois University, 2004.
- “Supermassive Black Hole Binaries as Galactic Blenders” – talk
B. Terzić. Department of Physics, Rochester Institute of Technology, 2004.
- “Gravitational Scattering By a Massive Galactic Center” – poster presentation
B. Terzić. American Astronomical Society Meeting, Pasadena, California, 2001.
- “Gravitational Scattering By a Massive Galactic Center” – seminar
B. Terzić. Department of Mathematics, Florida State University, 2001.
- “Gravitational Scattering By a Massive Galactic Center” – poster presentation
B. Terzić. “The Onset of Nonlinearity” workshop, University of Florida, 2001.
- “Triaxial Galaxy Models With Separable Potentials” – talk
B. Terzić. Belgrade Observatory, Serbia, 2000.
- “Triaxial Galaxy Models With Separable Potentials” – talk
B. Terzić. “Stellar Dynamics: From Classical to Modern” conference, St. Petersburg, Russia, 2000.
- “Triaxial Galaxy Models With Separable Potentials” – talk
B. Terzić. Leiden University, Netherlands, 2000.
- “Chaos In the Solar System” – two talks
B. Terzić. Department of Mathematics, Florida State University, 1999.
- “Recovering Orbits Using Lie Transform Perturbation Methods” – seminar
B. Terzić. Department of Mathematics, Florida State University, 1998.
- “Period Tripling Bifurcations in Axisymmetric Scale-free Potentials” – talk
B. Terzić. Division of Dynamical Astronomy Annual Meeting, Charlottesville, Virginia, 1998.
- “Period Tripling Bifurcations in Axisymmetric Scale-free Potentials” – poster presentation
B. Terzić. Workshop “Nonlinear Dynamics and Chaos in Astrophysics”, University of Florida, 1998.

MEMBERSHIP IN ACADEMIC GROUPS AND SOCIETIES

2007 –	Institute of Electrical and Electronics Engineers	<i>Member</i>
2007 –	Serbian Academic Club, Chicago	<i>Member</i>
2007 –	Serbian Academic Diaspora of Montenegro	<i>Member</i>
2007 –	Serbian Cultural and Arts Center <i>St. Sava</i> , Chicago	<i>Board Member</i>
2006 –	American Physical Society	<i>Member</i>
2001 – 2002	American Astronomical Society	<i>Member</i>
1997 –	Pi Mu Epsilon, Mathematics Honor Society, Florida State University	<i>Member</i>
1996 –	American Mathematical Society	<i>Member</i>
1993 –	Kappa Mu Epsilon, Mathematics Honor Society, Liberty University	<i>Member</i>
1993 – 1994	Alpha Lambda Delta, National Honor Society	<i>President</i>
1993 – 1995	Alpha Lambda Delta, National Honor Society	<i>Member</i>

COMPUTER LANGUAGES AND SOFTWARE

- Proficient in Fortran 77/90 (including parallel programming), C, Basic, Pascal, assembler.
- Working knowledge of C++.
- Proficient in Maple, Matlab, PV-Wave (IDL).
- Proficient on UNIX/Linux and Microsoft Windows platforms, working knowledge of MacOS.
- Working knowledge of shell scripting.
- Proficient in LaTeX, Microsoft Office and OpenOffice suites.

LANGUAGES

- Fluent in Serbian (and its variants: Bosnian, Croatian, Montenegrin) and English.
- Basic knowledge of Brazilian Portuguese.

OTHER ACTIVITIES

- Reviewer for the *Astrophysical Journal* and the *Monthly Notices of the Royal Astronomical Society*.
- Science Fair judge.
- Webmaster for the Serbian Cultural and Arts Center St. Sava, Chicago <http://stsavachicago.org>