#### **Curriculum Vitae**

Mehmet Atakan GürkanTel: +90-216-4839000 x 2312Sabancı ÜniversitesiGSM: +90-542-2460699Mühendislik ve Doğa Bilimleri FakültesiFax: +90-216-4839550Orhanlı-Tuzla 34956 İstanbulEmail: ato.gurkan@gmail.comTurkeyWeb: http://www.strw.leidenuniv.nl/~gurkan

Born January 8, 1974 in İstanbul, Turkey Turkish Citizen

# **Research Interests**

- **Theoretical Physics and Astronomy:** Dynamics of Near-Keplerian Systems, Dynamics of Dense Stellar Systems, Formation and Evolution of Massive Black Holes, Timing Characteristics of Radio Pulsars, Interior Structure of Neutron Stars, Superfluidity and Superfluid Mixtures.
- **Computational Physics and Astronomy:** Efficient Solutions of Kepler's Equation, Symplectic Integration Methods, Monte-Carlo Simulations, Parallel Computational Methods, Utilizing GPUs for Computational Astronomy, Solutions of Nonlinear Differential Equations, Data Exchange Formats for Numerical Astronomy.

# Education

- **1998-2005** Ph.D. in Astronomy at Northwestern University, Evanston, IL, USA. Thesis title: "Formation of Massive Black Holes in Dense Star Clusters", Advisor: Prof. F. A. Rasio.
- **1996-1998** M.S. in Astrophysics at Middle East Technical University, Ankara, Turkey. Thesis title: "Statistics of Small Pulsar Glitches and Post-Glitch RXTE-PCA Observations of the Vela Pulsar". Advisor: Prof. M. A. Alpar.
- **1992-1996** B.S in Physics at Middle East Technical University, Ankara, Turkey. Graduated with Honors.

1989-1992 Ankara Fen Lisesi.

# Employment

- 2011-present Visiting researcher, Sabancı University, Istanbul, Turkey.
- **2009-2011** Post-doctoral research fellow, Leiden Observatory, Leiden University, the Netherlands.
- **2006-2009** Post-doctoral research fellow, Astronomical Institute "Anton Pannekoek", University of Amsterdam, the Netherlands.
- **2005-2006** Post-doctoral research fellow, Foundations Development, Sabancı University, İstanbul, Turkey.
- 2001-2005 Research Assistant with Prof. F. A. Rasio, Department of Physics and Astronomy, Northwestern University, Evanston, IL, USA.
- **1998-2001** Teaching Assistant, Department of Physics and Astronomy, Northwestern University, Evanston, IL, USA.
- **1996-1998** Research/Teaching Assistant, Department of Physics, Middle East Technical University, Ankara, Turkey.

### Honors and Awards

- **2011-present** TÜBİTAK, Doktora Sonrası Geri Dönüş Burs Programı Fellowship, Sabancı University, Istanbul, Turkey
- **2008-2011** NWO, Veni Fellowship. Till August 2009 at Astronomical Institute "Anton Pannekoek", University of Amsterdam. Afterwards, at the Leiden Observatory, Leiden University, the Netherlands.
- **2006-2008** Marie Curie Intra European Fellowship, Astronomical Institute "Anton Pannekoek", University of Amsterdam, the Netherlands.
- **Fall 2004** Kavli Institute for Theoretical Physics, University of California Santa Barbara, Graduate Fellowship.
- **1996-1998** TÜBİTAK (Scientific and Technical Research Council of Turkey) Graduate Scholarship.
- 1992-1994 TÜBİTAK Undergraduate Scholarship
- **1989** Turkey under-16 national chess champion.

### **Publications**

#### **Refereed Papers**

- "Fractal geometry of angular momentum evolution in near-Keplerian systems", Gürkan, M. A. 2011, Monthly Notices of Royal Astronomical Society, Letters, **411**, L56.
- "Resonant relaxation near a massive black hole: the dependence on eccentricity", Gürkan, M. A. & Hopman, C. 2007, *Monthly Notices of Royal Astronomical Society*, **379**, 1083.
- "The present day mass function in the central region of the Arches cluster", Portegies Zwart, S., Gaburov, E., Chen, H.-C., & Gürkan, M. A. 2007, *Monthly Notices* of Royal Astronomical Society, **378**, 29.
- "Runaway collisions in young star clusters. II. Numerical results", Freitag, M., Gürkan, M. A., & Rasio, F. A. 2006, Monthly Notices of Royal Astronomical Society, 368, 141.
- "Massive Black Hole Binaries from Collisional Runaways", Gürkan, M. A., Fregeau, J. M., & Rasio, F. A. 2006, *Astrophysical Journal Letters*, 640, L39.
- "The Disruption of Stellar Clusters Containing Massive Black Holes near the Galactic Center" Gürkan, M. A., Rasio, F. A. 2005, *Astrophysical Journal*, 628, 236.
- "Formation of Massive Black Holes in Dense Star Clusters. I. Mass Segregation and Core Collapse" Gürkan, M. A., Freitag, M., & Rasio, F. A. 2004, Astrophysical Journal, 604, 632.
- "Monte Carlo Simulations of Globular Cluster Evolution. III. Primordial Binary Interactions" Fregeau, J. M., Gürkan, M. A., Joshi, K. J., & Rasio, F.A., 2003, Astrophysical Journal, 593, 772.
- "Post-glitch RXTE-PCA observations of the Vela pulsar" Gürkan, M. A., Baykal, A., Alpar, M. A., Ögelman, H. B., & Strohmayer, T. 2000, Astronomy and Astrophysics, 356, 1136.

#### **Submitted Papers**

**"Fifth Order Runge-Kutta-Nyström Methods with Complex Coefficients"**, Gürkan, M. A. 2011, submitted to *Journal of Computational and Applied Mathematics*.

#### **Conference Proceedings**

- "Collisions Between Single Stars in Dense Clusters: Runaway Formation of a Massive Object" Freitag, M., Gürkan, M. A., Rasio, F. A. 2007, in *Massive Stars in Interactive Binaries, ASP Conference Series 367*, N. St-Louis and A. Moffat, eds., p. 707
- "Run-away Formation of Intermediate-mass Black Holes in Dense Star Clusters" Freitag, M., Gürkan, M. A., Rasio, F. A. 2004, in *The Interplay Among Black Holes*, *Stars and ISM in Galactic Nuclei, IAU Symposium 222*, T. S. Bergmann, L. C. Ho and H. R. Schmitt, eds. (Cambridge Univ. Press, Cambridge).
- "Formation of an IMBH in a Dense Stellar Cluster Near the Galactic Center" Gürkan, M. A., Rasio, F. A. 2004, in *The Interplay Among Black Holes, Stars and ISM in Galactic Nuclei, IAU Symposium* 222, T. S. Bergmann, L. C. Ho and H. R. Schmitt, eds. (Cambridge Univ. Press, Cambridge).
- "Formation of Massive Black Holes in Dense Star Clusters" Rasio, F. A., Freitag M., & Gürkan, M. A. 2004, in *Carnegie Observatories Astrophysics Series, Vol. 1: Coevolution of Black Holes and Galaxies*, ed. L. C. Ho (Cambridge Univ. Press, Cambridge).
- "The Radial Distribution of Millisecond Pulsars in 47 Tuc" Gürkan, M. A., & Rasio, F.A. 2002, in ASP Conference Series, 296: New Horizons in Globular Cluster Astronomy, eds. G. Piotto, G. Meylan, S. G. Djorgovski, and M. Riello (Astronomical Society of the Pacific, California), 300.

### **Recent Conferences, Meetings and Workshops**

- A Symposium on Splitting Methods for Differential Equations, Institut de Matemàtiques i Aplicacions de Castelló, Castellón, Spain, September 2010.
- MODEST-10, Modeling Dense Stellar Systems, NAOC and KIAA, Beijing, China, August-September 2010
- Galactic Center Workshop: "The Galactic Center: A Window to the Nuclear Environement of Disk Galaxies", Shanghai, China, October 2009
- 5th UC Irvine Center for Cosmology Workshop: "Intermediate-Mass Black Holes: from First Light to Galactic Nuclei", University of California, Irvine, USA, April 2009.
- Frontiers in Computational Astrophysics: "The Origin of Stars, Planets and Galaxies", Ascona, Switzerland, July 2008.

N-body dynamics in near-Keplerian potentials, Lorentz Center, Leiden, Netherlands, May-June 2007.

## Selected Talks, Seminars and Colloquia

- *Fractal Analysis for Stellar Dynamics,* seminar given at Boğaziçi University, Physics Department, October 2011.
- *Fractal Geometry of Angular Momentum Evolution in Near-Keplerian Systems*, seminar given at Radboud University Nijmegen, Department of Astrophysics, November 2010.
- An Application of Fractals to Stellar Dynamics, seminar given at Sabancı University, February 2010.
- Adapting splitting methods to stellar dynamics: a wishlist, talk given at Castellón meeting (see above)
- *An Application of Fractals to Stellar Dynamics*, API pizza talk, given at Anton Pannekoek Institute, Amsterdam, December 2009.
- *Resonant Relaxation Around Massive Black Holes,* talk given at Ascona Meeting (see above).
- *Resonant Relaxation Around Massive Black Holes,* talk given at the Lorentz Center Workshop (see above).
- *Resonant Relaxation Around Massive Black Holes,* seminar given at Institute of Astronomy. March 2007, Cambridge, UK.
- *Disruption of a Cluster at the Galactic Center: Resolving the Youth Paradox,* talk given at Astrophysics Journal Club of University of California, Los Angeles, November 2004, Los Angeles, California.
- Disruption of a Cluster at the Galactic Center: Resolving the Youth Paradox, talk given at Kavli Institute for Theoretical Physics, Galaxy-Intergalactic Medium Interactions program, November 2004, Santa Barbara, California. Recording available at: http://online.itp.ucsb.edu/online/igm04/gurkan/
- Data Exchange/Storage Format for Stellar Dynamics Codes, talk given at MODEST-4 Meeting, Geneva Observatory, 2004
- Formation of Massive Black Holes in Dense Star Clusters through Early Core Collapse, seminar given at Institute Colloquium at Astronomisches Rechen-Institut, Heidelberg, Germany, 2003

- *Formation of Massive Black Holes in Dense Star Clusters,* department seminar at Northwestern University, Department of Physics and Astronomy, 2003
- Neutron Star Retention Problem in Globular Clusters, talk given in Turkish at TÜBİTAK High Energy Astrophysics Unit Meeting Ankara, Turkey, 2002
- *Why Strange Stars do not Glitch,* talk given at Northwestern University Theoretical Astrophysics Group Meeting, 2002

## Outreach

- Gave public lectures on two (2009 and 2010) National Skygazing Festivals (Ulusal Gökyüzü Gözlem Şenliği) in Saklıkent, Antalya.
- Organized two-day long astronomy activities in my high school, Ankara Fen Lisesi, at the beginning of 2009-2010 academic year. This included talks, a permanent picture exhibition (IAU's "From Earth to the Universe"), a trip to a local observatory and various small projects with students. As part of these activities, I gave the opening lecture for the academic year.
- Helped founding an astronomy club in my high school. During the academic year, the students in this club built ten six inch Dobsonian telescopes. I helped this project by finding funds from our alumni and put the students in contact with amateur telescope makers in Turkey.

## **Other Activities**

- **2002-2004** Built, administered and maintained a parallel Linux computer cluster for the Theoretical Astrophysics Group, Northwestern University.
- **2001** Administered and maintained a parallel Linux computer cluster for the High Energy Physics Group, Northwestern University. Prepared documentation and educated the group about batch systems and parallel computing.
- **1996-** Member of Turkish Linux Users Group. Participated in translation projects and co-edited a Turkish book on introduction to Linux. Prepared the T<sub>E</sub>X packages for "Turkuaz", a Turkish Linux distribution.
- **1995-1998** Founding member of Society of Physics Students at Middle East Technical University, Ankara, Turkey. Served as the president for a brief amount of time.

### References

Prof. M. Ali Alpar Sabancı University Faculty of Engineering and Natural Sciences Orhanlı - Tuzla, 34959, İstanbul Turkey Tel: +90-216-483-9510 alpar@sabanciuniv.edu

Prof. Simon Portegies Zwart Leiden Observatory Niels Bohrweg 2 2333 CA, Leiden the Netherlands Tel: +31-71-561-8429 spz@strw.leidenuniv.nl

Dr. Yuri Levin School of Physics, Monash University P.O. Box 27 VIC 3800 Australia Tel: +61 (03) 9905-3646 Yuri.Levin@monash.edu Prof. Frederic A. Rasio Northwestern University Department of Physics and Astronomy 2145 Sheridan Road Evanston, IL 60208 USA Tel: +1-847-491-7904 rasio@northwestern.edu

Prof. Stephen L. W. McMillan Department of Physics and Atmospheric Science Drexel University Philadelphia, PA 19104 USA Tel: +1-215-895-2723 steve@zonker.drexel.edu