# Curriculum Vitae

## Dr. rer. nat. Erik Schnetter


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### Biographical Data

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| Birth date: | August 7, 1970 |
| Birth place: | Letmathe, Germany |
| Citizenship: | Germany |
| Languages: | English and German (native), basic French |

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### Education

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| Universität Tübingen, Germany | Physics | Diplom 1998 |
| Penn State University, USA | Physics | |
| Universität Tübingen, Germany | Physics and Mathematics | PhD 2003 |

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### Employments and Affiliations

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| Albert–Einstein–Institut, Germany | Postdoc | 2003 – 2005 |
| Louisiana State University, Center for Computation & Technology | Research Scientist (unlimited term) | since 2005 |
| Louisiana State University, Department of Physics & Astronomy | Gratis Appointment | since 2007 |

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### Scientific Interests

- Binary Black Hole systems and the gravitational radiation they create, in particular as will be detected by LIGO and LISA
- Black Hole horizons, their dynamic properties, practical algorithms to measure these numerically, and their topology
- (Long-soft) Gamma Ray Bursts, in particular the collapsar model, including general relativistic magneto-hydrodynamics, realistic equations of state, and radiative transport processes
- Numerical methods supporting the research above, including adaptive mesh refinement, multi-block methods, and mimetic discretisations
- Efficient computational infrastructure for petascale computing, also supporting the research above

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## Key Scientific Achievements

- Introduced Isolated and Dynamical Horizons to the numerical relativity community, including a novel method to calculate the spin of rotating black holes in a coordinate independent and highly accurate manner
- Developed an adaptive mesh refinement driver, which is now used by many numerical relativity groups for black hole, neutron star, and stellar core collapse simulations
- Examined the collapse of rotating neutron stars and stellar iron cores in 3D, including the first calculations of the gravitational waveforms of such systems

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## Current Grants

Co-principal investigator on the NSF PIF grant *Collaborative Research: XiRel, a Next Generation Infrastructure for Numerical Relativity*. XiRel is a collaboration spanning three sites in the US to research and improve adaptive mesh refinement infrastructure and cyberinfrastructure technologies in the numerical relativity community (3 years, in total $360k).

Principal investigator on the NSF grant *SDCI HPC Improvement: Cactus Tools for Application Level Performance and Correctness Analysis (Alpaca)*. Alpaca will research and develop debugging and profiling tools for large-scale parallel scientific applications (3 years, $590k).

Co-principal investigator on the NASA STTR grant *Interfacing the Paramesh Computational Libraries to the Cactus Computational Framework* (ParCa). ParCa is a collaboration spanning four sites in the US, including the company Decisive Analytics Corporation, to improve mesh refinement capabilities in Cactus and to create a general relativistic magneto-hydrodynamics code (2 years, $210k at LSU).

Principal investigator of an NSF LRAC allocation supporting our numerical relativity research (1 year, 5.2 MSU, until March 2009).

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## Synergistic Activities

I am employed as research scientist at the CCT to perform research in numerical relativity, and to develop numerical relativity infrastructure for *Cactus* to support our group in that research.

I participate in the highly successful AEI–CCT Binary Black Hole collaboration, which has laid the foundations for many of the recent breakthroughs in simulation black holes, and which is one of the currently leading binary black hole physics groups.

I am one of the main authors of *CCATIE*, the AEI/CCT spacetime evolution code solving the Einstein equations. CCATIE was instrumental in several of the recent advances in binary black hole simulations. CCATIE is also used as spacetime solver for the *Whisky* general relativistic hydrodynamics code.

I am the original author and the project leader of *Carpet*, the adaptive mesh refinement and multiblock driver for Cactus. Carpet is prominently used at collaboration partners and by two competing major numerical relativity groups, and also at a number of smaller sites. I am also the main Cactus developer of the LSU relativity group.

I have organized several workshops and tutorials for numerical relativity, performance optimisation, visualisation, and for Carpet and Cactus. I gave a series of lectures on numerical relativity at the 2007 KISTI numerical relativity summer school in Pohang, South Korea.

I have contributed to and am senior investigator on multiple track 2 proposals answering the NSF call *High Performance Computing System Acquisition: Towards a Petascale Computing Environment for Science and Engineering*, for more than $70M each.

I have refereed manuscripts for the Canadian Journal of Physics (CJP), Classical and Quantum Gravity (CQG), the International Journal of Modern Physics D (IJMPD), Physics Review D (PRD), and Physics Review Letters (PRL).

My publication *A multi-block infrastructure for three-dimensional time-dependent numerical relativity*, by E. Schnetter, P. Diener, E. N. Dorband, and M. Tiglio, Class. Quantum Grav. **23**, S553-S578 (2006) was selected as a Research Highlight of 2006 and 2007 by the Editorial Board of Classical and Quantum Gravity.

I have 48 publications and 592 citations as reported on ADS (as of March 22, 2008). My ADS $h$-index is 14.

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## Professional Memberships

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| International Society on General Relativity and Gravitation | since 2004 |
| American Physical Society | since 2007 |