

# “Moving Planets Around” Writing Workshop

July 19 to August 2, 2017. Kobe, Japan

*Maxwell Cai (Leiden Observatory/University, the Netherlands)*

*Adrian Hamers (Institute for Advanced Study, USA)*

*Erez Michaely (Technion, Israel)*

*Javier Roa (Jet Propulsion Laboratory, California Institute of Technology, USA)*

## Scope

This workshop constitutes the first meeting in the process of writing the book entitled “Moving Planets Around”, within the framework of the Art of Computational Science (ACS) project. The book is inspired by “Moving Stars Around” authored by Piet Hut and Jun Makino, and aims to teach science students at the undergraduate level to carry out a complete exoplanet dynamics-related research project using  $N$ -body techniques. The reader will be able to independently follow the book, written in the Socratic (dialogue) format, and, after finishing, be able to carry out independent research involving  $N$ -body integration and write a short research paper. Given the popularity of exoplanet research and the accessible level of the book, we expect the book to be received with high interest, especially by young students interested in astrophysics.

## Work plan


Prior to meeting in Japan, the book outline and chapter content will have been defined. During the workshop, the following points will be covered

- Reflect on the chapters that have been written so far.
- Implement the core of the  $N$ -body simulator in Python.
- Streamline these chapters; this is particularly important because of using the Socratic (dialogue) format.
- Brainstorm on the remainder of the book.
- Continue writing the other chapters.

Once the simulator is ready, the main chapters will cover the theoretical background and code implementation. After the workshop, each member of the team will be assigned specific and well-defined tasks to complete the remaining chapters.

## Expected outcomes

This workshop will be the first time the team physically meets as a whole. It would be a unique opportunity to unify the individual work of each member of the team. In addition,



after these two weeks of collaborative work, we will be able to clearly define the best standards for writing and coding as a group. Specific outcomes of the workshop will be:

- Software for conducting  $N$ -body simulations.
- Draft versions of the main chapters.
- Clear outline of the work leading to completion of the book.

## The team

The team is comprised of postdoctoral researchers specialized in gravitational dynamics:

- Maxwell Cai (Leiden Observatory): computational astrophysics.
- Adrian Hamers (Institute for Advanced Study): dynamics of hierarchical systems, in particular exoplanets.
- Erez Michaely (Technion, Israel): dynamics of triple systems, Solar system dynamics.
- Javier Roa (Jet Propulsion Laboratory, California Institute of Technology): astrodynamics, high-fidelity orbit propagation, numerical methods.

The team is very diverse, including Chinese, Dutch, Israeli and Spanish nationalities, working in the United States, the Netherlands, and Israel. Although this diversity helps to bring in multiple perspectives in the project, not being physically present at the same institution also complicates direct communication. The workshop is therefore crucial to facilitate such communication among the team members.

The workshop will be hosted by Prof. Jun Makino and Prof. Piet Hut, who will also provide their guidance and assistance during the preparation of the book.