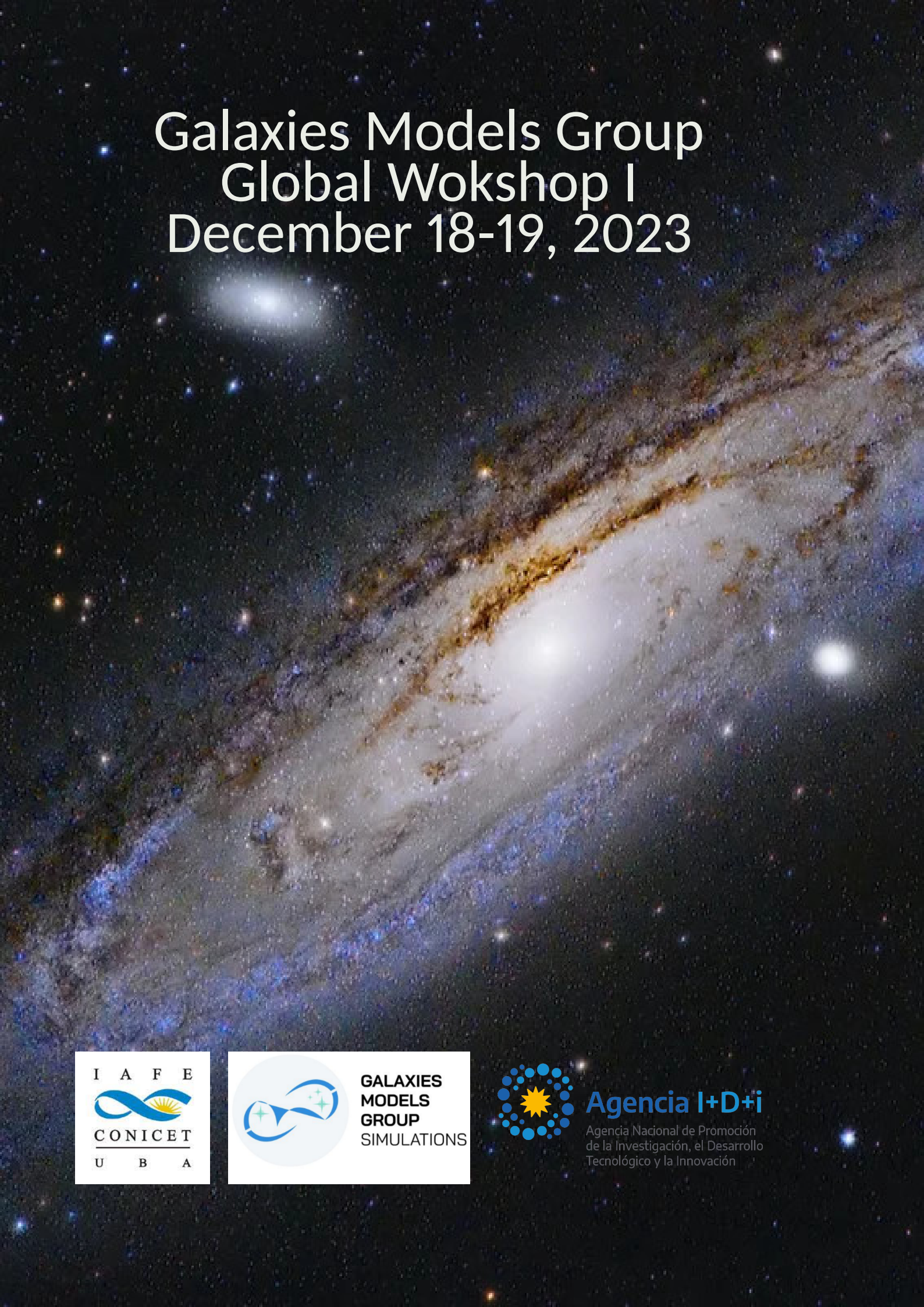
Galaxies Models Group
Global Wokshop I
December 18-19, 2023



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GALAXIES
MODELS
GROUP
SIMULATIONS

Agencia I+D+i
Agencia Nacional de Promoción
de la Investigación, el Desarrollo
Tecnológico y la Innovación

Galaxies Models Group Global Workshop I
December 18-19, 2023 Instituto de Astronomía y Física del Espacio
Ciudad Autónoma de Buenos Aires
Argentina

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About

Rationale

Galaxies Models Group (GMG) is a research group focused on the study of galaxy formation and evolution since the early Universe until present times. It is a “young” group, created in 2021, with the aim at providing clues about the origin of observed galaxies in the real Universe. To achieve its goals, GMG uses theoretical models, numerical simulations and statistical techniques. The comparison between model galaxies and real ones is crucial in its work, for which GMG has the support of different observers.

The main goal of this first GMG extended meeting is to foster the interaction and collaboration between GMG members. It also aims at strengthening the use of novel tools required for GMG group activities, such as Machine Learning and Scientific Visualization.

The meeting will also encompass enough time for the exchange of ideas, recent results, and ongoing projects. New strategies will be also designed to stimulate the interaction between our group and the community.

Organizing committee

Dr. María Emilia De Rossi
Lic. Salvador Esteban Grimozzi
Dr. María Soledad Nakwacki

Timetable

CT: Contributed Talk

Monday, 18 of December

11:00–11:30	**Reception and welcome remarks**
11:30–13:00	Group discussions
13:00–13:15	**Group photo**
13:15–15:00	**Lunch, cake and cookies**
15:00–15:30	**Coffee**

Tuesday, 19 of December

9:00-9:05	**Presentation**		
9:05-10:40	CT	**Lic. Lucas J. Zenocratti** UNLP-CONICET	Machine Learning for beginners: fourth meeting
10:40-11:00	**Questions**		
11:00-11:20	**Coffee**		
11:20-11:50	CT	**Lic. Salvador E. Grimozzi** IAFE-FCEyN-UBA-CONICET	Chemical enrichment and assembly histories of MW-like halos in the ARTEMIS simulations
11:50-12:00	**Questions**		
12:00–13:30	**Lunch**		
13:30–14:30	CT	**Lic. M. Candela Zerbo** UNLP-IAFE-FCEyN-UBA-CONICET	Video and Image Editing Workshop: second meeting
14:30-14:40	**Questions**		
14:40-15:00	**Coffee**		
15:00-16:00	CT	**Dr. María Emilia De Rossi** IAFE-FCEyN-UBA-CONICET	Galaxies Models Group: achievements, current challenges and strategies for the future
16:00–16:30	**Surprise announcements**		
16:30	**Farewell**		

Moderators

- Morning session: María Cecilia Tomasini
- Afternoon session: María Soledad Nakwacki

List of Abstracts – Talks

Tuesday 19th

Machine Learning for beginners: fourth meeting

Lic. Lucas J. Zenocratti[1,2] **CT**

[1] Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, La Plata, Argentina
[2] Instituto de Astrofísica de La Plata, CONICET-Universidad Nacional de La Plata, La Plata, Argentina

The fourth meeting of the Workshop is divided in two parts:

- First part - Example of classification with neural networks: we will see a typical and simple example of image classification with neural networks, using the 'Keras' Python package.

- Second part - Regression with neural networks: we will address the problem of predicting values from a given set of measurements. The basic concepts will be seen through a simple example, introducing the ideas required to approximate functions, in order to carry out predictions using neural networks. We will also see a simple application example using 'Keras' in Python.

Chemical enrichment and assembly histories of MW-like halos in the ARTEMIS simulations

Lic. Salvador E. Grimozzi[1,2] **CT**

[1] Facultad de Ciencias Exactas y Naturales, UBA, Argentina
[2] Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina

Two populations of dwarf galaxies can be associated with the Milky Way. The “surviving” satellites that orbit it in the present time and the “disrupted” ones that were accreted by it and whose debris now are part of the stellar halo. We studied the stellar MZR and the stellar [Mg/Fe] abundances of disrupted and surviving dwarfs of simulated Milky Way mass haloes in ARTEMIS, a suite of 42 zoomed-in cosmological hydrodynamical simulations. We also were able to trace a connection between them and their merger histories. We developed efficient techniques to study the assembly of haloes, track the evolution of the dwarfs and characterize their environment. Some of these techniques include the reconstruction and analysis of each halo’s merger tree. We successfully identify a strong correlation between the stellar metallicity (Z_*, measured by the stellar [Fe/H] abundances) and the stellar mass (M_*) in both populations of satellites. We found that higher-mass satellites tend to show lower stellar [Mg/Fe] than those in the low mass range, which is consistent with observational data from the MW. At fixed stellar mass, disrupted dwarfs are more metal enriched and more alpha-enhanced (i.e. present higher stellar [Mg/Fe]) than their surviving counterparts. We found that these differences are influenced by the accretion times of disrupted dwarfs and by the different environments where both populations evolved.

Video and Image Editing Workshop: second meeting

Lic. Candela Zerbo[1,2,3] **CT**

[1] Facultad de Ciencias Astronómicas y Geofísicas, UNLP, Argentina
[2] Facultad de Ciencias Exactas y Naturales, UBA, Argentina
[3] Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina

In this second edition, we will delve even deeper into the advanced features that make the Kdenlive video editor a powerful tool for creating short informative videos. We will explore various ways to implement transitions and transformations on images, enhancing the visual storytelling of the audio narrative. Additionally, we will revisit key concepts in image editing, aiming to create end credits that will be dynamically presented to the audience.

Galaxies Models Group: achievements, current challenges and strategies for the future

Dr. María Emilia De Rossi[1,2] **CT**

[1] Facultad de Ciencias Exactas y Naturales, UBA, Argentina
[2] Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina

We are a research group focused on the study of galaxy formation and evolution since the early Universe until present times. We use theoretical models and numerical simulations to provide clues about the origin of observed galaxies in the real Universe. At the moment, we are nine members: three PhDs in Physics, three PhD students and three undergraduate students. Since its foundation, in 2021, we have had many achievements, such as the creation of our own Web Page and our own space in social networks. We have also carried our group colloquia, with invited speakers, and focused workshops on different topics. In this interactive talk, we will discuss such achievements and how they can be improved in the future. We will analyse our current challenges as a “young” group and we will design strategies to tackle them in the future. In particular, we will analyse plausible methods to use our research to generate a positive impact on society.

List of Participants

Yamila Danela Bufarrato	Departamento de Física, FCEN-UBA, Argentina
María Emilia De Rossi	Facultad de Ciencias Exactas y Naturales, UBA, Argentina; Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina
Salvador Esteban Grimozzi	Facultad de Ciencias Exactas y Naturales, UBA, Argentina; Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina
Leandro Daniel López	Departamento de Física, FCEN-UBA, Argentina
María Soledad Nakwacki	Facultad de Ciencias Exactas y Naturales, UBA, Argentina
Ramiro Santamaría	Departamento de Física, FCEN-UBA, Argentina
María Cecilia Tomasini	Departamento de Física, FCEN-UBA, Argentina
Lucas J. Zenocratti	Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, La Plata, Argentina; Instituto de Astrofísica de La Plata, CONICET-Universidad Nacional de La Plata, La Plata, Argentina.
María Candela Zerbo	Facultad de Ciencias Astronómicas y Geofísicas, UNLP, Argentina; Facultad de Ciencias Exactas y Naturales, UBA, Argentina; Instituto de Astronomía y Física del Espacio, CONICET–UBA, Argentina

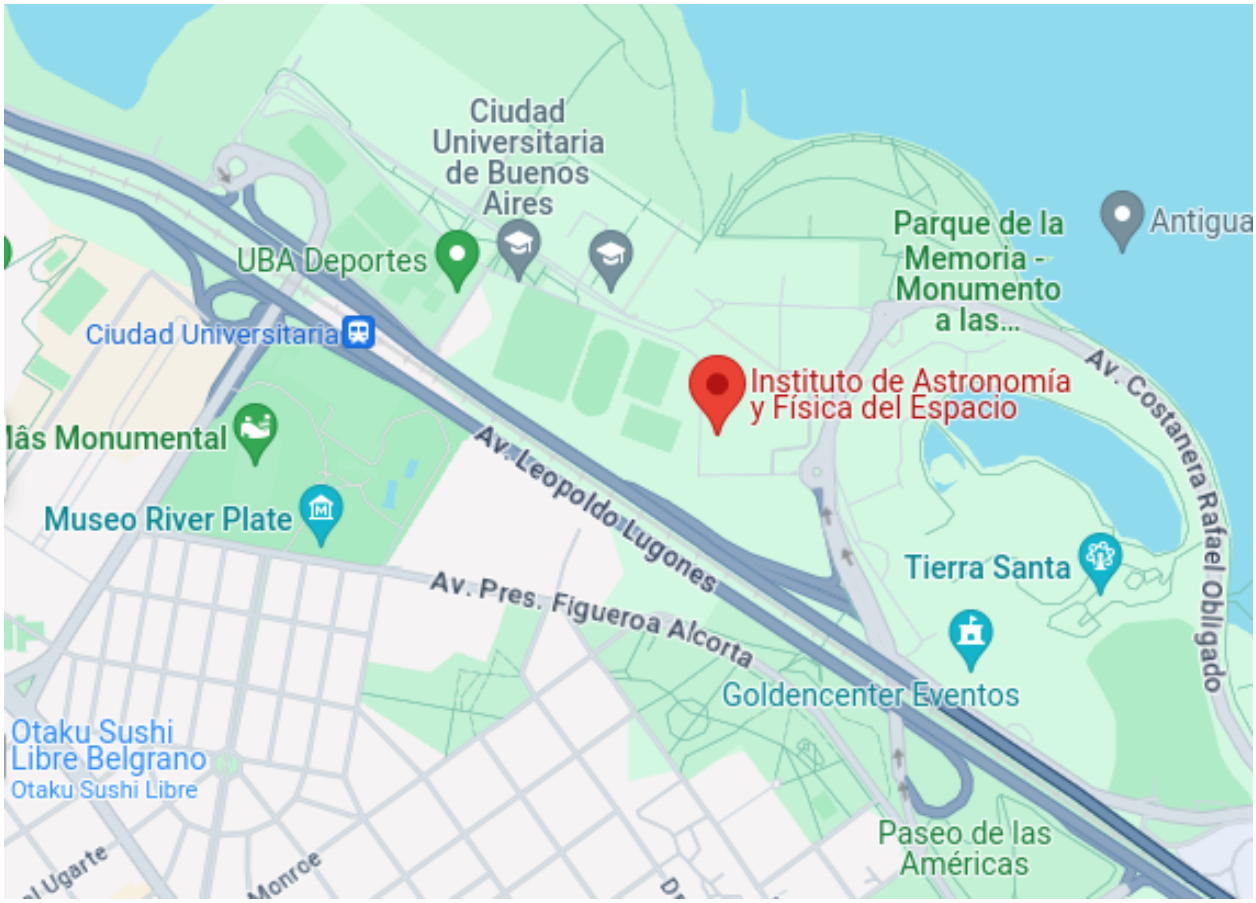
Useful Information

Monday 18^{th} in-person **activities** will be held at the **Instituto de Astronomía y Física del Espacio** (IAFE). It is situated in Ciudad Universitaria nearby Pabellón 1 and Pabellón +Infinito. **Coffee breaks and lunches** on Monday 18^{th} will be held in the cafeterias of Facultad de Ciencias Exactas y Naturales.
Tuesday 19^{th} **talks** will be held online.
The link will be sent to participants by e-mail prior to the event.

How to get to the IAFE?

The IAFE buiding can be reached through the entrance located in front of Parque Norte coming from Av. Intendente Cantilo or from Av. Costanera Rafael Obligado. Main bus and train lines to Ciudad Universitaria are:

- **Bus:** lines 28, 107, 166, 42, 45, 33, 34, 37, 160
- **Train:** Belgrano norte R. S. Ortiz.



Institutions

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