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## 1. Introduction

RIANA encompasses seven European networks of top-level Research Infrastructures (RIs) to cover the most advanced techniques relevant for synthesis, nanofabrication, processing, characterization, analytics, and simulation capacity. Highly customized and efficient access to 69 infrastructures is coordinated via a single-entry point and enabled through a comprehensive Science and Innovation Service. The scope of Work Package 2 (WP2) is to set up a strategic organizational structure to ensure efficient support of access to the large and diverse set of interdisciplinary techniques available in RIANA, beyond simple access provision. The RIANA Science Service will enable the timely and efficient evaluation of scientific questions using the entire suite of techniques available through the RIANA consortium. This comprehensive access will be jointly supported by a team of Junior Scientists distributed across the various facilities of the RIANA network, which operate under the guidance of an Expert Network consisting of senior researchers and instrumentation scientists from all installations providing access within RIANA.

The Junior Scientists elevate the RI experience to an entirely new level by offering customized Science Services that support users from the inception of ideas through hands-on experiments, data analysis, and the dissemination of results. The concept of Junior Scientists has been adapted from the project ReMade@ARI<sup>1</sup> due to its great success there: their involvement is a key pillar in the overall organization of access provision of RI which is expected to ensure the greatest impact from access to world-class RIs.

The Junior Scientist's mandate is to help user groups make optimal use of all techniques offered by RIANA. Namely, they will provide scientific advice, support, and streamlined processes for the efficient use of RIANA's resources, from proposal writing to access execution. Indeed, they will assist the users in the preparation of their proposals, guide them to the optimal facilities and assist them during the experiments at RIANA facilities as well as in subsequent data analysis, ensuring high-quality service throughout the entire user-experiment process—from initial consultation to final data interpretation. The organizational structure of the access provision is designed to incentivize interdisciplinary experiments and to make the most effective use of the installations.

The present document, D2.1 "*Junior Scientist Allocation*", is the first deliverable of WP2, marking a significant step in implementing this strategic organizational structure. It aims to outline the guidelines for the work of Junior Scientists, detailing their areas of specialization and the host institutions where they will be based. Additionally, it will be a reference document with a clear outline of the specific activities in which the Junior Scientists will be involved, with relative role and responsibilities.

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<sup>1</sup> <https://remade-project.eu/>

## 1.1 Definitions

- **Junior Scientist (JS):** A member of the RIANA project responsible for providing customized scientific support to users, particularly in the areas of outreach, experimental planning, data analysis, and dissemination of results.
- **Junior Scientist Board (JSB):** The governing body comprising all Junior Scientists of the RIANA project, responsible for facilitating knowledge exchange and experiences among Junior Scientists.
- **Chairs of the JSB:** The Chair and co-Chair of the Junior Scientist Board (JSB) are selected among the Junior Scientists. They participate in the meetings of the RIANA Executive Board, General Assembly, and Nano Strategy Board, representing the JSB there without voting rights.
- **Senior Scientist:** A senior researcher within the RIANA project providing expertise and facilitating successful experiments. Every Junior Scientist is also mentored by a Senior Scientist.
- **Science Service:** The Science Service refers to the collective efforts of individuals involved in Work Package 2 (WP2), including both Junior Scientists and Senior Scientists. As key service, a central access point is operated for scientific support, accessible via the email address [scienceservice@riana-project.eu](mailto:scienceservice@riana-project.eu).
- **Smart Science Cluster (SSC):** Refers to all Junior Scientists, WP2 leader and task leaders.
- **Smart Science Cluster Coordinator:** The individual who will coordinate activities within WP2, specifically related to Junior Scientists (JS) work.

## 1.2 The Junior Scientist in RIANA

The Junior Scientists (JS) constitute the core of the RIANA Science Service offering tailored scientific services, assisting users from the inception of ideas through to hands-on experiments, data analysis, and dissemination of results, ensuring maximum impact from access to world-class research infrastructures. Beyond the great enhancement of direct user support, the Junior Scientists play a significant role enabling RIs to transfer from in-person access to more online service, by providing standardized data analysis solutions that are interoperable between RIs, which is a critical bottleneck today.

Each Junior Scientist is specialized in a specific experimental method and should have done a PhD in a field related to nanoscience and nanotechnology. A total of 21 JS will be employed through the RIANA project, distributed across the various RIs to offer specialized support. In particular:

- 16 Junior Scientists have been allocated with defined areas of expertise, as detailed in the table below;
- 5 additional Junior Scientists are to be allocated in the second half of the project. This flexibility allows for the adaptation of the Science Service to address emerging topical gaps and scientific needs as the project progresses. These reserve positions will be allocated based on strategic decisions by the General Assembly upon recommendation from the Nano Strategy Board.

The Junior Scientists will be recruited by their host organizations for a period of 36 months. During this time, they will dedicate 2/3 of their efforts to RIANA activities. The remaining 1/3 of their time will be reserved for their own research, funded by their employer as in-kind contribution. The JS will participate in research across different facilities, occasionally traveling to assist in experimentation, and collaborate with international scientists from diverse disciplines and backgrounds. This involvement will significantly expand their experience and professional network.

While Junior Scientists cover a broad range of techniques and applications, they cannot address every need. Therefore, they are backed by Senior Scientists at each facility offering access. The network of Senior Scientists plays a crucial mentoring role: they connect RIANA to the already existing research activities at the research infrastructures, act as facilitators, and trigger ideas for new research in nanoscience and nanotechnology. Ultimately, the Senior Scientists act also as instrument contact and enable users to perform successful experiments, working closely with the Junior Scientist assigned to the user project to best exploit the opportunities provided by RIANA.

### Junior Scientists Recruitment

Table 1 provides the list of networks and host organizations for allocated Junior Scientists along with their respective specializations. The recruitment of JS across the various networks is already underway, with the first individuals already hired. The process will be completed by Month 9 (end of November 2024).

During the recruitment process, Diversity, Equity, and Inclusion (DEI) is given high importance. Special attention is given to promoting gender diversity. This approach ensures a diverse and inclusive team that brings a wide range of perspectives and expertise to the RIANA project.

*Table 1 - List of networks and host organisations for Junior Scientists and their respective specialization*

Network	Host	JS Specialization	Name of JS
<b>LEAPS</b>	DESY	X-ray imaging: In 2D and 3D, full-field mode and scanning mode. Use of different contrast modalities including absorption, holography, phase-contrast, ptychography, X-ray fluorescence, X-ray diffraction, X-ray beam induced current, X-ray excited optical luminescence.	TBD
	SOLEIL	X-ray photoemission spectroscopy: X-ray photoelectron spectroscopy (XPS), angle-resolved photoelectron spectroscopy (ARPES), and absorption spectroscopy (XAS).	TBD
	MAX IV	X-ray scattering: Small and large angle X-ray scattering, in transmission as well as in grazing incidence geometry.	TBD
	ALBA	X-ray diffraction: High resolution powder diffraction and high pressure micro-diffraction, as well as small and wide angle X-ray scattering including operando and in-situ sample environments.	TBD
	SOLARIS	X-ray absorption spectroscopy: X-ray absorption near-edge structure spectroscopy (XANES), extended X-ray absorption fine structure (EXAFS), pump-probe XAS, quick-XAS.	TBD
<b>e-DREAM</b>	AREA	Electron imaging and spectroscopy: Advanced (scanning) transmission electron microscopy (TEM) techniques for in situ / operando experiments combined with electron energy loss spectroscopy (EELS).	TBD

	FZJ-ER-C	Electron imaging: Four-dimensional scanning and aberration corrected high-resolution transmission electron microscopy (TEM), integrated differential contrast imaging and off-axis electron holography, with an emphasis on the use of quantitative phase contrast techniques.	Tingting Yang
	UAntwerp	Electron spectroscopy and imaging: Advanced electron energy loss spectroscopy (EELS), energy dispersive X-ray spectroscopy (EDX), electron tomography, imaging of beam sensitive materials using low-dose techniques, and in-situ heating, liquid, and gas experiments.	Nicolas Gauquelin
	ICN2	Electron imaging and spectroscopy: (Scanning) transmission electron microscopy (TEM) imaging and related energy dispersive (EDX) and/or electron energy loss spectroscopy (EELS).	Sara Martí-Sánchez
<b>RADIATE</b>	HZDR	Focused ion beam: Irradiation with focused ion beams using microbeams (accelerator sources), nanobeams (liquid metal ion sources) and focused beam with diameters of 0.4 nm to 3 nm (He/Ne ion microscope sources).	TBD
	UAM	Ion implantation: Materials modification by irradiation with ion beams (heavy and light ions) to dope the material at selected depth or modifying atomic structure by energy deposition.	TBD
	RBI	Elemental characterization: Ion beam analysis techniques (PIXE, RBS, NRA, TOF-ERDA, MeV SIMS, etc.) using focused or broad beam MeV light and heavy ions.	TBD
<b>LENS</b>	FZJ-JCNS	Neutron techniques: In situ/in operando experiments with a combination of neutron techniques at MLZ in Garching (Germany) including chemistry and biology laboratories and auxiliary equipment if needed.	Debasish Saha
<b>EuroNanoLab</b>	IMT	Nanofabrication techniques: Fabrication of micro- and nano-devices, with various masking, deposition, and etching processes.	Octavian-Gabriel Simionescu
	UKaunas	Nanofabrication techniques: Clean room technologies and main tools of nanofabrication, such as e-beam / UV / nanoimprint lithography, deep reactive ion etching. For characterization and analysis of laboratory-based X-ray diffraction, X-ray photoelectron spectroscopy, Raman scattering, and atomic force microscopy.	Andrius Žutautas
<b>EUSMI</b>	AMU	Safety of R&D in nanocharacterization: Mainly biological techniques as well as other instruments of EUSMI to investigate safety of nanomaterials, both in terms of their physicochemical and biological activity	Jakub Jagielski

## 2. Expectations for the Role of a Junior Scientist

### 2.1 Meetings

The Junior Scientists distributed across various facilities of the RIANA network will form the Junior Scientists Board (JSB) to ensure the exchange of knowledge and gained experiences between the JSs. The JSB meets at least twice a year and additionally on request. During the first meeting, the Junior Scientists elect a chair and a vice chair who are invited to attend (without voting rights) the project Executive Board (EB) and General Assembly (GA) meetings to get an ear and a strong voice within the project consortium. The JSB chair is also included in the project Nano Strategy Board (NSB) without voting rights. JSB allows the junior scientists to collect experiences in project management beyond their deep involvement in scientific service provision to users.

In addition to the bi-annual JSB meetings, Smart Science Cluster (SSC) meetings will be held bi-weekly to ensure all activities progress in line with the project timeline. Attendance at these meetings is mandatory for all JSs.

If a JS is unable to attend the SSC meeting, communication must be sent to the SSC Coordinator in advance. All JSs are expected to actively participate in the discussions during the meetings and to contribute efficiently to the best execution of all the actions related to the access provision support, enlightening weaknesses and correction measures. To facilitate the mutual sharing of experiences within the team, all JSs are expected to deliver scientific talks within the framework of the meetings on their areas of expertise, highlighting their scientific background, key achievements, and specific areas of interest. JSs are also encouraged to present relevant case studies, e.g. approved user proposals that used the Science Service, illustrating practical applications, challenges faced, solutions implemented, and the outcomes achieved. These presentations are critical to share valuable insights and best practices within the group. At each meeting, a JS is assigned to collect the minutes, to be shared after each meeting. All JS, including those who could not attend the meeting, are expected to thoroughly read and approve the minutes to ensure that everyone is informed and agrees with all tasks and decisions taken.

Timeline for meetings:

Type of meeting	Purpose of the meeting	Expected date
<b>Smart Science Cluster Meeting</b>	Explanation of activities to JS already hired and start of activities with first users	1 <sup>st</sup> meeting early September 2024, repeated bi-weekly
<b>1<sup>st</sup> JSB meeting</b>	Election of JSB Chair and Vice-chair	End of September 2024
<b>2<sup>nd</sup> JSB meeting</b>	Revision of the JSB Chairs and evaluation of activities	In the framework of the 1 <sup>st</sup> annual meeting of RIANA, probably in March 2025

## 2.2 User support

Strictly following the concept of a customized service that matches the actual needs of users, the tasks of the JSs are not pre-defined in detail; instead, they will be defined on a user-project basis according to specific user needs and the specialization of each JS.

JSs will provide tailored scientific support, assisting users from the initial idea stage (pre-proposal) through the submission of the full proposal, to hands-on experiments at the RIANA facilities (post-proposal acceptance), to data analysis and interpretation, and contributing to reports and publications.

### *Pre-proposal phase*

Users can submit a pre-proposal (not mandatory) to informally discuss ideas for RI access before submitting an actual proposal. In this phase, Junior Scientists will provide advanced user support, including technical advice prior to proposal submission, and liaise with other research infrastructures to ensure the feasibility of experiments that combine different techniques. This support is highly relevant especially for inexperienced users, as it provides initial input on the benefits of combining different techniques for their research interests. Junior Scientists will help users choose the best techniques, enabling even inexperienced users to access the most advanced RIs in Europe.

To avoid any conflicts of interest, Junior Scientists are entirely decoupled from any proposal review activities. This strict separation of responsibilities allows Junior Scientists to side with users, offering Science Service without users fearing any evaluation.

When pre-proposals are received, the SSC Coordinator will select within max. 2 weeks one Junior Scientist as main contact point (henceforth called Main Junior Scientist, MJS) for the principal investigator (PI). The MJS must contact the Principal Investigator (PI) within two working days of receiving the pre-proposal, assigned by the SSC Coordinator. The MJS will invite the PI to an initial online meeting for discussion.

All Junior Scientists (JS) are expected to check new pre-proposals and notes, evaluating whether their expertise would be beneficial and contribute when appropriate. During the initial meeting, the MJS should inform the PI of the following critical points related to RIANA:

- RIANA requires the use of two characterization techniques from two different infrastructures.
- Templates for the full proposal are available on the RIANA webpage and should be used.
- Access is provided as Trans-National Access (TNA). As consequence, the majority of the application team, including the PI, must not be from the country where access is being requested.
- Publishing the findings as open access is strongly recommended.

After initial discussions with the PI, the MJS is responsible for submitting a feedback form to the SSC Coordinator as well as to all JS for feedback.

The submission of a pre-proposal should be considered an opportunity. There is no obligation for the user to finalize the submission into a full proposal once a pre-proposal has been submitted and interaction with the JS has occurred.



### *Full proposal phase*

If the user decides to submit a full proposal, Junior Scientists are expected to provide advice and feedback on drafts of the full proposal to ensure they meet the required standards and guidelines. JS should be well-acquainted with the facilities and instruments within their area of expertise available in the RIANA portfolio. JS are responsible for advising which facility would be the most suitable for the proposed research based on the available techniques and expertise. If further expertise is needed, JS should contact Senior Scientists for additional discussions.

### *During project execution*

When proposals are accepted, the Junior Scientists will support users with hands-on experiments and accompany the users in the interpretation of the data. The SSC Coordinator will select one Junior Scientist, depending on their expertise, to be the main contact point with the user. If the full proposal is based on a pre-proposal, the MJS of the pre-proposal may typically act as MJS of the full proposal.

The Main Junior Scientist will contact the Principal Investigator to arrange a meeting. This meeting will include all Junior Scientists whose expertise is relevant to the project, to evaluate the scope of support required. The support provided by JS encompasses various aspects of project execution and can include:

- Assistance with preparatory activities prior to experiments
- Provision of 1-2 days of specialized training before the scheduled beamtime. This ensures that the PI and their team are adequately equipped and prepared.
- On-site provision of hands-on assistance throughout the experiment, offering technical support and troubleshooting to optimize data collection.
- Guidance and support for data analysis, both during and after the experiment. This ensures accurate interpretation of results and facilitates timely progress.
- Review and feedback on manuscripts intended for publication.

This collaborative effort ensures high-quality scientific reporting and adherence to publication standards. JS can travel to experiment sites if requested by users. This facilitates direct on-site support and ensures effective collaboration between JS and project teams.

## 2.3 Time commitment

JS are expected to dedicate 2/3 of their employed time to support the RIANA project, specifically focusing on assisting users and facilitating project-related activities. The remaining 1/3 of the JS's employed time is allocated for individual research activities of the JS, enabled as in-kind contribution by the host. Details of the work performed as part of the 1/3 employment are subject to agreements with the host institution.

JSs may pursue research initiatives through their own proposals within the RIANA framework, effectively assuming the role of users themselves.

## 2.4 Holidays

JS are required to notify the SSC in advance of any planned absences, providing details such as the duration of their absence and, if feasible, nominating a designated individual to field inquiries during

their absence. Additionally, JS are obligated to document their planned holidays, conference attendance, and experiment schedules in a table that will be provided by the WP2 leader.

## 2.5 Dissemination

Junior Scientists are tasked with actively promoting RIANA. This includes, but is not limited to, actively advocating for RIANA at scientific conferences they attend, provided it aligns with the conference's focus. For all dissemination activities specifically related to RIANA, the SSC Coordinator must be informed.

In RIANA, JSs that are individually assigned to each user project are in charge of the following aspects which are also related to the dissemination of project outcome:

- Support of users from experiment planning to the timely dissemination of the results
- Guidance of users towards ethical publishing following the principles of open science, FAIR data, and open access publications
- Dissemination of user projects and results
- Ensuring acknowledgement of EU funding

## 3. Workflow

### 3.1 Pre-proposal

Upon receipt of a pre-proposal, the SSC Coordinator is responsible for establishing a designated folder within the cloud directory under the corresponding identification, wherein the pre-proposal PDF is securely stored. Subsequently, the SSC Coordinator has max 2 weeks to indicate a Main Junior Scientist (MJS) to initiate the communication with the proposal Principal Investigator (PI). Any additional JS may join this first contact.

Within two workdays of designation, the MJS contacts the PI to arrange an online meeting for an initial discussion. During this meeting, the focus is on evaluating the support capabilities of the JS and matching them with the need of the proposers.

Following this initial discussion with the PI, the pre-proposal is presented by the MJS at an internal meeting to the entire JS Team for comprehensive feedback. This meeting facilitates a thorough discussion on the feasibility of the proposed techniques and approaches.

Senior Scientists can be incorporated into the process at any stage, and the pre-proposal may undergo further discussion during subsequent internal meetings as required. The MJS is responsible for requesting these additional resources from the SSC Coordinator.

MJS should complete the feedback form on the portal approximately two weeks after the initial contact with the PI.

### 3.2 Draft proposal

The MJS, along with any other involved JS, provides help and feedback throughout the formulation of proposal drafts to the PI, including defining experiment modalities and constraints and promoting the use of correlative workflows in combination with other techniques provided by the consortium. During this process the MJS should inform the PI of the following:

- The JSs offer support on “best-effort” base and are ultimately not responsible for the success.
- The support by JSs does not qualify them for being co-authors of proposals.
- The PIs are not entitled to use the JSs names in the proposal without their consent.

If a PI does not respond to initial emails from the MJS, a reminder email should be sent (e.g., after three days). If no response is received within a week, the MJS should note this in the proposal folder and the pre-proposal marked as “abandoned”.

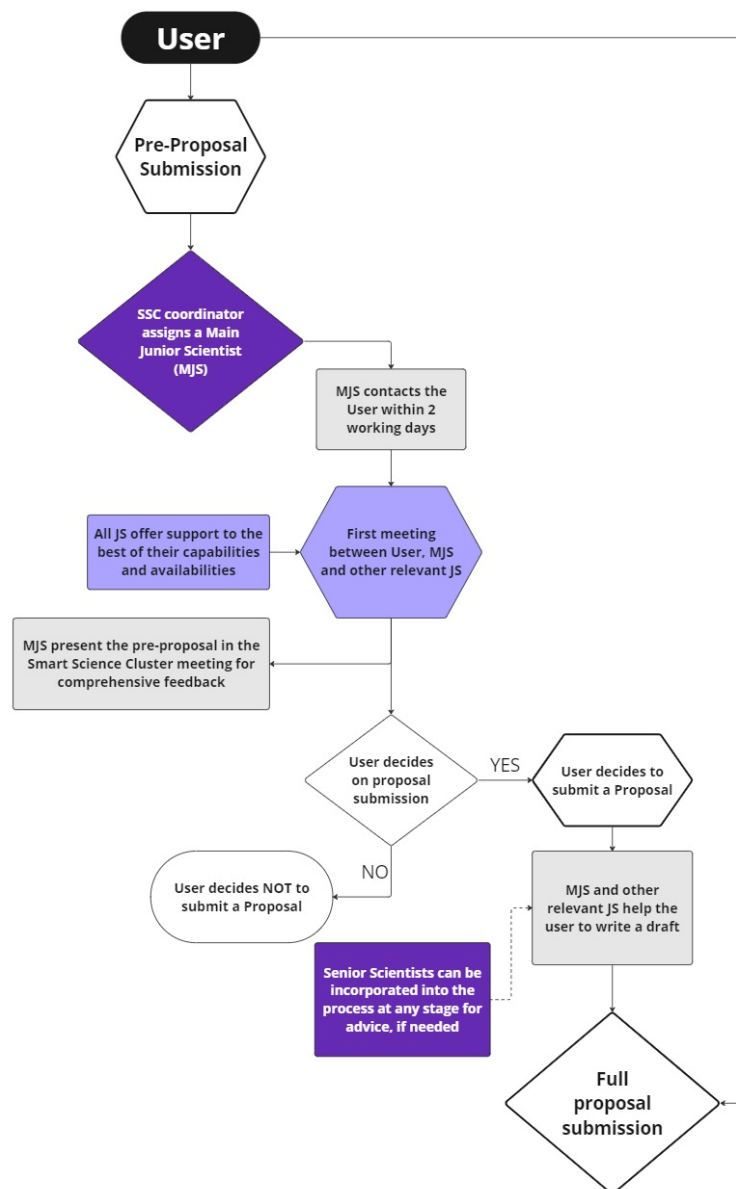


Figure 1 Workflow for the pre-proposal and proposal draft phase.

Ultimately, the content of proposals is the responsibility of the users. The JS offer support but should not be held accountable for the outcome of the review process. JSs are not involved in the review process.

### 3.3 Proposal acceptance & support in the project phase

Within one week of the Principal Investigator being informed of the proposal's acceptance by the RIANA user office, the designated Main Junior Scientist (MJS) reaches out to the PI to convey that the JSs Team is available to provide assistance for the project. MJS should emphasize the necessity for the PI to include JSs in project communications, as the facilities may not be aware of optional JS support. During the first meeting, all JSs whose expertise is relevant to the project should attend, introduce themselves and outline the support services they can offer, categorized as follows:

- Before visits: Pre-experiment training.
- During visits: Hands-on or remote assistance during experiments.
- After visits: Aid with data analysis, guidance on experimental report composition, discussion of results, assistance with follow-up experiments or publication.

It should also be emphasized that JS are not expected to carry the main work load of experiments, instead, they provide support to users on a “best-effort” base.

## 4. Publications

All proposals submitted through the academic route must aim to lead to publications, contingent upon the successful execution of the experiment. Junior Scientists who actively participated in the experiments should be appropriately acknowledged in the publication. Depending on the extent of their involvement, they may be included in the acknowledgments section or as co-authors. Publications that include data that were obtained through RIANA must include the RIANA funding statement to acknowledge support.

Publishing as open access is strongly encouraged to ensure broad accessibility. MJS are required to notify the SSC, WP6 leader and the project Coordinator about all publications resulting from access provided through RIANA.

Publications resulting from the portion of time allocated to Junior Scientists funded by their own institution, constituting one-third of their total time, are exempt from the dissemination rules applied to RIANA activities.