



EDITORIAL .....	3
DOCTORAL TRAINING IN THE HELMHOLTZ ASSOCIATION .....	4
GUIDELINES FOR THE COMPLETION OF PHD PROJECTS WITHIN THE HELMHOLTZ ASSOCIATION .....	6
I. STATUS OF PHD CANDIDATES AND GOALS OF THE PHD .....	7
II. COURSE OF THE PHD .....	8
III. GENERAL CONDITIONS FOR THE PHD PROJECT .....	11
IV. QUALITY CONTROL AND NEXT STEPS .....	13

## DEAR READERS,



Prof. Dr. Otmar D. Wiestler,  
President of the Helmholtz Association

As Germany's largest scientific organization, the Helmholtz Association is committed to providing answers and solutions to the grand challenges of the 21st century – the urgent questions of science, society and industry. Through their outstanding work, creativity and commitment, PhD candidates play a major role in the pursuit of this mission. They are also the top scientists and senior managers of tomorrow. The training and promotion of PhD candidates is furthermore a central pillar of the successful and close collaboration of Helmholtz Centers with the universities.

Accordingly, the Helmholtz Association has placed the promotion of PhD candidates at the center of a comprehensive talent management concept. Our aim is to identify talented early-stage researchers early on and provide them with the conditions they need in order to flourish. The period during the PhD and immediately thereafter is decisive for a researcher's future career. Together with the universities, the Helmholtz Centers take the responsibility to offer the highest quality of doctoral training that qualifies PhD candidates for a wide range of career options both within and beyond science. We are especially committed to encouraging women to pursue leadership positions.

The Helmholtz Centers and the universities also have a responsibility towards society and the scientific community to comply with high quality standards in doctoral training and to establish and maintain a culture of good scientific practice.

The creation of 34 Helmholtz Research Schools and Helmholtz Graduate Schools has been a significant contribution to the establishment of quality standards in doctoral training in past years. Furthermore, the Directors of the Helmholtz Centers and the President of the Helmholtz Association have agreed on common PhD guidelines. These guidelines define minimum standards for the optimal design of doctoral training. They contribute towards a common understanding of quality, and establish and promote a culture in which responsibility is taken at every level for the development of talented early-stage researchers.

As a result, the Helmholtz Association offers outstanding conditions for PhD candidates: exciting research topics of great social relevance and exceptional research infrastructure on the one hand, and first-class supervision and comprehensive talent management with tailored training programs, on the other.

I warmly invite you to discover our quality standards and offers for PhD candidates, and to become a part of our talent management culture.

A handwritten signature in blue ink that reads "Otmar D. Wiestler". The signature is fluid and cursive, with a long, sweeping tail on the final letter.

Otmar D. Wiestler



# DOCTORAL TRAINING IN THE HELMHOLTZ ASSOCIATION

## The Helmholtz Association: Shaping the future with sustainable research

The Helmholtz Association is Germany's largest scientific research organization. More than 38,000 staff work at its 18 scientific-technical and biological-medical research centers and the annual budget amounts to more than € 4.5 billion (as of 2018).

The Helmholtz Association performs cutting-edge research which contributes significantly to solving the grand challenges of science, society and industry. Scientists at Helmholtz focus on highly-complex systems that define human life and the environment. Examples include securing future mobility and energy supply, preserving the environment for future generations, and finding treatments for diseases that have hitherto remained untreatable. The activities of the Helmholtz Association aim to secure the long-term foundations of human life and establish the technological basis for a competitive economy.

To meet these responsibilities, the Helmholtz Association focuses on six research fields: Energy, Earth and Environment, Health, Aeronautics, Space and Transport, Key Technologies and Matter. Within these six research fields, Helmholtz scientists collaborate with scientists from other Helmholtz Centers with external partners – across disciplinary, organizational and national borders. Indeed, the name Helmholtz stands for sustainable research in which networking is the key principle behind scientific thought and action. Through sustainable and program-orientated research, the Helmholtz Association aims to create an effective basis for shaping the future.

Helmholtz researchers and the staff responsible for technology transfer work with great dedication and success on translating research findings into practical applications. In doing so, they fill the Helmholtz Association's mission with life and ensure that research at Helmholtz benefits society and economy.

The large-scale and complex research infrastructures of the Helmholtz Association guarantee outstanding research conditions. The operation and management of research infrastructures is an integral part of the mission of the Helmholtz Association and one of its unique features among Germany's science organizations. This infrastructure can also be used by research teams from universities and non-university research institutions both within Germany and abroad, thereby serving as a focal point of many major international collaborations and networks.

Further information: [www.helmholtz.de](http://www.helmholtz.de)



## Independent Research and Individual Support

An interesting PhD project that addresses relevant research topics can serve as a springboard for an academic career and opens the door to senior positions outside the sciences. The approximately 8000 PhD candidates, who are educated together with the universities, are therefore a major target group of talent management activities of the Helmholtz Association.

Since 2006, the Helmholtz Association has established 34 Research Schools and Graduate Schools at its Centers. These schools offer structured doctoral education, providing excellent supervision, stable working conditions and a training program tailored to the individual needs of their early-stage researchers. In addition, PhD candidates are integrated into renowned research teams and international networks and have access to the Helmholtz Association's unique research infrastructures.

### Helmholtz Research Schools

Helmholtz Research Schools bring together up to 25 outstanding young doctoral candidates are small units whose research projects are focused on a specific research topic. In these schools, PhD candidates experience team work and collaboration in networks as is customary in top-level research. They are supervised by a team of experienced scientists and receive individually customized professional training and advice.

### Helmholtz Graduate Schools

Helmholtz Graduate Schools provide an umbrella structure for PhD candidates from different research areas at a Center. The PhD candidates work in research teams and exchange ideas in seminars, lectures and internships. Furthermore, they receive professional training and career development support.

### Professional Skills Training for PhD candidates

The Helmholtz Association has recognized the importance of professional skills training for the career development of early-stage researchers. Helmholtz Graduate and Research schools offer comprehensive training measures tailored to the specific needs of doctoral candidates. These courses, workshops and information sessions are conducted by professional trainers and advisors, and support doctoral candidates in obtaining the skills and knowledge required for the next stage of their career, be it in or outside of academia. Many of these training measures are organized in collaboration with university partners and other Helmholtz Centers and include invited alumni, thus providing a platform for interdisciplinary exchange and networking.

Further information: [www.helmholtz.de/phd](http://www.helmholtz.de/phd)



# GUIDELINES FOR THE COMPLETION OF PHD PROJECTS WITHIN THE HELMHOLTZ ASSOCIATION

## Introduction

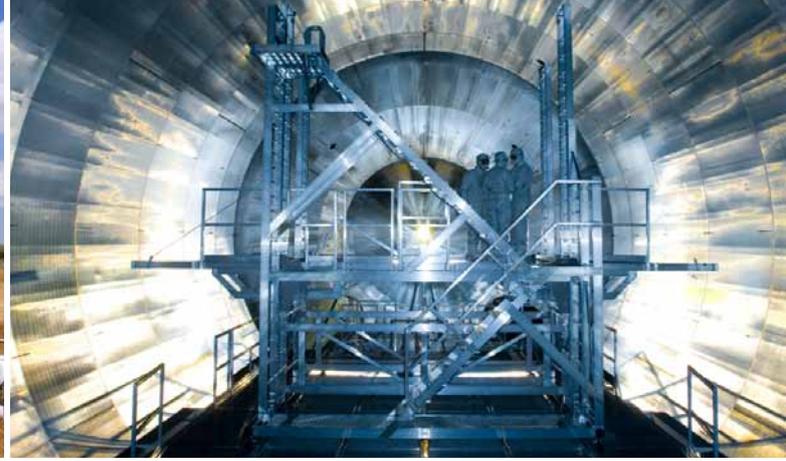
PhD candidates make significant contributions to the research efforts of the Helmholtz Association, and at the same time have the potential to become the senior scientists and managers of tomorrow. The Helmholtz Association offers its PhD candidates a wide range of training and development opportunities and an optimal preparation for their future career. With the Helmholtz PhD guidelines, the members of the Helmholtz Association have agreed on common standards for the completion of PhD projects. The guidelines assure a high quality of doctoral training, provide guidance to PhD candidates and supervisors, and promote a culture of responsible talent management.

- The Helmholtz Association endorses the objectives of the Charta der Vielfalt (Diversity Charter). Accordingly, the Association appreciates and fosters the skills and talents of all PhD candidates. The selection, supervision and assessment of PhD candidates takes place without discrimination on the basis of gender, nationality, ethnic origin, religion or world view, physical ability, age, sexual orientation or identity.<sup>2</sup>

- The Helmholtz Association aims to offer PhD candidates regular employment contracts, including social contributions, even though the granting of fellowships shall remain possible. In the interests of career planning, the duration of the contract should match the expected duration of the PhD; in consultation with the supervisory committee, funding shall be guaranteed at least until the submission of the PhD thesis to the university.
- Universities and Helmholtz Centers collaborate closely, pooling their expertise, to promote PhD candidates in the best possible way. The Helmholtz Association is committed to the white paper published in 2004 by the German Rectors' Conference (HRK) and the Helmholtz Association for the joint support of early-stage researchers. The doctoral degree is awarded by the universities in accordance with the respective PhD regulations.

<sup>1</sup> [www.charta-der-vielfalt.de/en/diversity-charter/](http://www.charta-der-vielfalt.de/en/diversity-charter/).

<sup>2</sup> Cf. *ibid.*



## I. STATUS OF PHD CANDIDATES AND GOALS OF THE PHD

PhD candidates conduct autonomous research under supervision during their PhD. They are the early-stage researchers within the Helmholtz Association and they are appropriately supported and integrated into the Association.

- PhD candidates as defined by these guidelines have been admitted to a doctorate by a university, and are generally supervised by a university professor jointly appointed by the university and a Helmholtz Center. If the primary supervisor is not employed by a Helmholtz Center, the PhD candidate is supervised by at least one senior Helmholtz researcher. In respect to supervision, the type of doctoral training format (e.g. individual PhD or within a structured PhD program) or the type of funding (e.g. employment contract or fellowship) is not relevant.
- The independent investigation of a research topic lies at the center of a PhD, but PhD candidates receive constant feedback from their supervisors. PhD candidates are to be regarded as early-stage researchers undergoing preparation for the next stage of their career through the completion of a PhD.<sup>3</sup>
- Upon the completion of their PhD, early-stage researchers matured into competent and critically minded scientists with a good understanding of their field of research and are integrated into the scientific network in this field. In most cases, they have published some or all of their research results in peer-reviewed journals and discussed them in the

relevant expert circles. Furthermore, they have a clear notion of their future career development and are prepared to perform responsible activities both within and outside the sciences.<sup>4</sup>

PhD holders are in a position to:

- thoroughly examine and question complex circumstances
- understand, apply and advance theories and methods
- identify and independently work on relevant research topics
- orientate themselves in an international environment and build up networks

<sup>3</sup> Cf. "First Stage Researchers", European Commission (2011): Towards a European Framework for Research Careers.

<sup>4</sup> Cf. ibid. and LERU (2010): Doctoral degrees beyond 2010: Training talented researchers for society.



## II. COURSE OF THE PHD

### A. Supervision

**PhD candidates and supervisors are jointly responsible for the PhD project. PhD candidates are generally supervised by a PhD committee or a comparable body.**

- PhD candidates bear the primary responsibility for the completion of their PhD project and for their academic and personal development. They conduct research in an autonomous fashion and take responsibility for the progress of their project. Specifically, this means that:
  - PhD candidates inform themselves about their rights and duties and about the relevant doctoral regulations of their university.
  - PhD candidates comply with the principles of good scientific practice.
  - PhD candidates regularly report to their PhD committee on the progress of their PhD project, based on the agreed work plan, which can be adjusted where necessary.
  - PhD candidates inform their PhD committee or other appropriate body at an early stage about any potential difficulties, and take part in the search for solutions of conflict situations.
  - PhD candidates integrate into their working group and daily life at the Center. They network within the community and thereby further their independence.
  - PhD candidates take an active role in their own career development and make use of appropriate offers and advisory services. The PhD committee and PhD candidate discuss possible career goals for the period after the PhD at an early stage.
- Supervisors of doctoral candidates share responsibility for the structured oversight of the PhD project and the academic and personal development of PhD candidates. They possess the necessary competencies and sufficient time resources for this task. They regularly undergo further training, and are open to reflection upon and improvement of their role as supervisors.
  - In addition to academic supervision, supervisors have the task to foster PhD candidates' independence, to give them freedom in their work, and to motivate them. Specifically, supervisors introduce PhD candidates to the scientific community and help them to establish their own network and collaborations and motivate them to participate in conferences and support them to make relevant contributions. Supervisors support PhD candidates to publish their work, enable them to gain teaching and supervision experience, and support their career development.
  - Supervisors serve as role models for PhD candidates. Consequently, they act in accordance with the principles of good scientific practice and hold the PhD candidates accountable to doing the same. Supervisors should also encourage PhD candidates to reflect on the scientific and ethical ramifications of their activities, and motivate them to scrutinize the subject of their research from a societal perspective.
- At the Helmholtz Center, PhD candidates are supervised by three scientists holding a doctoral degree, who together comprise a PhD committee or a comparable body. Primary

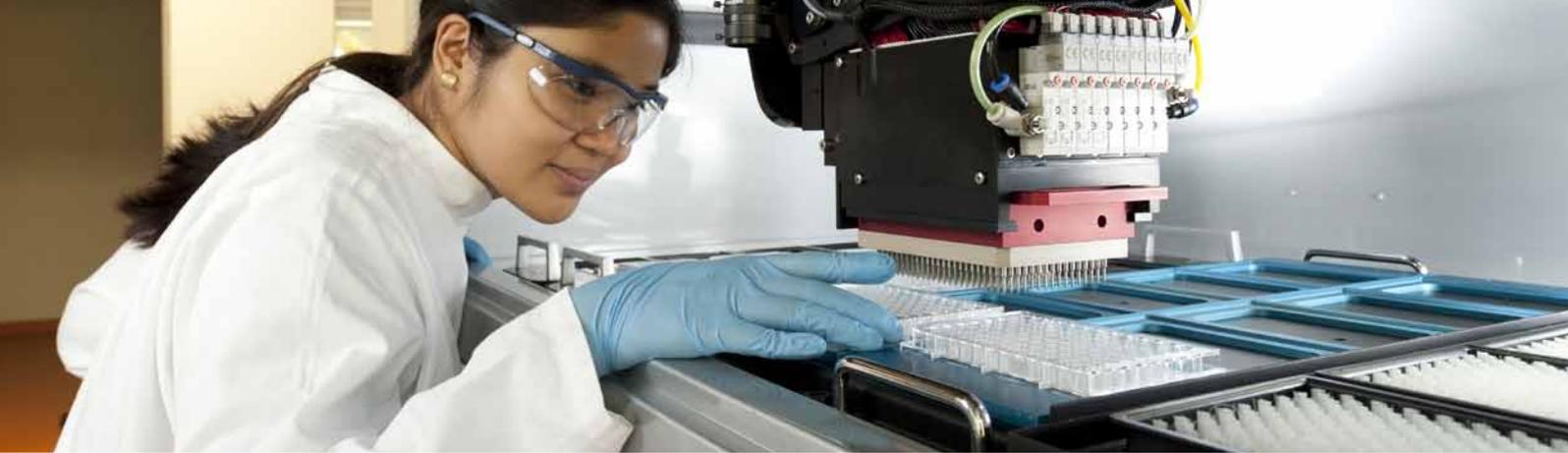


responsibility is held by one member of the committee (primary supervisor), with the other supervisors exercising an advisory and supporting role. At least one of the supervisors should be affiliated with a university and should have the authority to award doctoral degrees.

- At the start of the PhD, the supervisor and PhD candidate enter into a PhD agreement. This agreement clearly sets out the responsibilities of all parties involved in the PhD process. The PhD agreement serves to provide guidance and enable quality assurance. As a minimum, it must contain the following elements: Names of the involved parties; topic and object of research; objectives; start date; approximate schedule; dates for supervision meetings; commitment to good scientific practice (e.g. pursuant to DFG standards<sup>5</sup>); and a reference to the applicable PhD regulations. In order to take into account the dynamic nature of scientific research, the schedule may be adjusted on an ongoing basis. PhD candidates and supervisors are responsible for ensuring that the admission process to pursue a doctoral degree at a faculty or division of a university and the registration process at the Helmholtz Center are started immediately after the PhD agreement has been made. The Helmholtz PhD agreement is to be reconciled with the PhD agreement required by the university, if applicable.
- It is advisable to create a tailored training plan that sets out the specialized and interdisciplinary learning objectives of the PhD candidate.<sup>6</sup> To this end, supervisors and PhD candidates may request support from the human resources department, the central graduate office, or the career guidance office (cf. also Section B). The training plan should be reviewed on a regular basis and adjusted where necessary.
- The PhD project and conditions should be designed so that the PhD can be completed in three to four years. Ongoing and intensive oversight by the supervisors is important to ensure that this time frame is met. Meetings with the PhD committee should take place on at least a yearly basis. In addition, PhD candidates should have the opportunity to present their research to a specialist audience, e.g. in colloquiums or at conferences at least twice during the course of the PhD. Any extensions of the deadline for completion of the PhD project must be anticipated in a timely manner, in consultation with the PhD committee to allow a new completion schedule to be jointly developed. In line with this completion schedule, funding is to be sought for the period until the submission deadline.

<sup>5</sup> Cf. [http://www.dfg.de/foerderung/grundlagen\\_rahmenbedingungen/gwp/](http://www.dfg.de/foerderung/grundlagen_rahmenbedingungen/gwp/).

<sup>6</sup> Cf. in this regard e.g. European Science Foundation (2012): A pan-European Professional Development Framework for Researchers, and European Science Foundation (2012): Developing Research Careers in and Beyond Europe.



## B. Personal and Career Development

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- The subject-specific training forms the core component of the PhD, which can take different forms depending on the area of research. The acquisition of additional interdisciplinary competencies is recommended in all research domains. The Helmholtz Centers offer PhD candidates a diverse range of training opportunities, e.g. through their own graduate programs, such as Helmholtz Research and Graduate Schools, and through the programs of their partner universities. Supervisors actively support participation in these programs. Together with their supervisor PhD candidates should create a training plan that establishes a meaningful link, in terms of time and content, between training measures and the research project (see above). Participation in training measures should be documented, and upon completion of the PhD, these should be certified, e.g. in the form of a certificate. Such certificates will enhance PhD graduates' career prospects and enables international comparability of the degree obtained.
- It is the responsibility of the Helmholtz Centers and supervisors to assist PhD candidates in developing their career prospects. Where possible, PhD candidates should be given insight into a variety of work contexts, e.g. through internships or collaborations with external partners. They may seek career advice at any time and, if appropriate, participate in mentoring

programs from the Centers. To ensure responsible talent management, PhD candidates are supported in planning their career after the completion of the PhD.

- Mobility periods are encouraged if they are appropriate in the setting of the specific research project. Mobility can take place and can be supported at different levels: international (e.g. research stays abroad or joint doctoral degrees); intersectoral (e.g. internships in industry); interdisciplinary (e.g. collaboration with scientists from other fields); and virtual (e.g. within collaborations and networks).



### III. GENERAL CONDITIONS FOR THE PHD PROJECT

**Structured application and selection procedures, fixed contact persons in the administration, center-wide graduate offices, offers for PhD candidates with families, support for international PhD candidates, and clearly defined conflict resolution procedures establish optimal conditions for doing a PhD.**

- The PhD programs of the Helmholtz Centers establish a structured application and selection procedure with clearly defined requirements, transparent a selection process, center-specific but standardized assessment criteria, and fixed contact persons. The relevant information can be found on the website of each Helmholtz Center. During the selection process, applicants' personal profiles and their full range of experience are taken into account. In addition to academic qualifications, which constitute the primary criterion for the selection of PhD candidates, additional competencies such as teaching and supervision experience (e.g. of Master and Bachelor students), team spirit, and involvement in student bodies or outreach activities.<sup>7</sup>
- The Helmholtz Centers provide PhD candidates with the necessary infrastructure for the completion of their PhD project, which may include measurement slots on large devices or access to samples.
- Each Helmholtz Center has graduate offices or fixed contact persons within the administrative structure, providing PhD candidates with advice on how to structure and organize their PhD project. They also inform PhD candidates about training offers.
- During their project, PhD candidates receive support in the form of flexible working hours and childcare facilities. If PhD candidates take parental leave, the Helmholtz Association aims to extend their funding period accordingly.
- PhD candidates from abroad sometimes face major challenges as a result of cultural and language barriers, which can affect the progress of their PhD project and their integration. To address these challenges, the Helmholtz Centers offer advice and training, as well as networking opportunities. The Centers and supervisors are responsible for informing PhD candidates about these opportunities. The Centers guarantee that all information necessary for doing a PhD project is available at least in English, or that appropriate translation support is made available.
- The technology transfer offices of the Helmholtz Centers serve as confidential contact points for inventions, patent protection and business ideas. PhD candidates and their supervisors have a responsibility to inform the technology transfer offices of inventions or research results that may require initiation of patent procedures before their publication.
- The Helmholtz Centers actively encourage the formation of PhD candidate representation groups such as the Helmholtz Juniors<sup>8</sup> and other networking activities among PhD candidates. The Centers ensure that PhD candidates have a say in decisions affecting the training and development of PhD candidates.

<sup>7</sup> In this regard, the Helmholtz Association orientates itself i. a. to the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (European Commission 2005).

<sup>8</sup> [www.helmholtz.de/juniors](http://www.helmholtz.de/juniors).



- The Helmholtz Centers recognize the importance of excellent supervision and taking on the responsibility of supporting early-stage researchers. They encourage supervisors to undertake ongoing training and to share experiences among themselves.
- In the event of conflict situations, the Helmholtz Centers offer fixed contact persons and clearly defined procedures that are known to all parties involved in the PhD project.



## IV. QUALITY CONTROL AND NEXT STEPS

The Helmholtz Association is an organization that frequently updates its strategic focus and strives towards constant development.

- All PhD projects carried out and supervised at the Centers of the Helmholtz Association are documented from the outset. The resulting statistical data are used for the Centers' reporting and form the basis of the Association's quality control procedures and strategic orientation.<sup>9</sup>
- The Helmholtz Association has implemented a range of instruments for quality control of doctoral training. The evaluations in the context of its program-oriented funding-scheme and the interim evaluations of the Helmholtz graduate and Research Schools are central to this. Furthermore, the Helmholtz Centers are advised to systematically integrate their PhD candidate support in their quality control systems.
- The Helmholtz Association strongly recommends that established quality standards and structures of the Helmholtz Research Schools and Graduate Schools are continued following the end of the initial funding. The Helmholtz Association welcomes the introduction of a code of conduct for supervisors, the establishment of career tracking systems and follow-up surveys by individual Centers as meaningful quality control measures.
- The Helmholtz Association seeks a close exchange with other national and international stakeholders in the training of PhD candidates to share examples of good practice and initiate collaborations. In addition to working with universities, cooperation with industry is of particular importance for the Helmholtz Association to provide new career prospects for PhD candidates.
- In 2019, an expert group will interview the Helmholtz Centers about their experience with these PhD Guidelines and discuss whether its content is still appropriate.

<sup>9</sup> The data are recorded by the responsible administrative unit and include, e.g.: personal information; PhD start date; working title; name and institutional affiliation of the main academic supervisor, name and institutional affiliation of the daily supervisor; main supervisor's written approval for the acceptance of the candidate; type of funding (fellowship, employment contract, etc.); and contract duration. In addition, main supervisors must submit a final report containing the following information: submission date of the PhD thesis; date of examination; grade; and, if applicable, employment after completion of the PhD and new address. The administration of a Helmholtz Center must also be informed if the PhD is not completed. PhD candidates and supervisors are jointly responsible for compiling the data. They must ensure that the data are submitted to the responsible administrative unit immediately after the conclusion of the PhD agreement and after the completion of the PhD. The PhD candidate must consent to the recording, use and processing of the above mentioned data in the PhD agreement or in another suitable manner.

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# MISSION OF THE HELMHOLTZ ASSOCIATION

We contribute to solving the major challenges facing society, science and the economy by conducting top-level research in strategic programs within our six research fields: Energy, Earth & Environment, Health, Aeronautics, Space and Transport, Matter, and Key Technologies.

We research highly complex systems using our large-scale devices and infrastructure, cooperating closely with national and international partners.

We contribute to shaping our future by combining research and technology development with perspectives for innovative application and provisions in tomorrow's world.

We attract and promote the best young talents, offering a unique research environment and general support throughout all career stages.

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