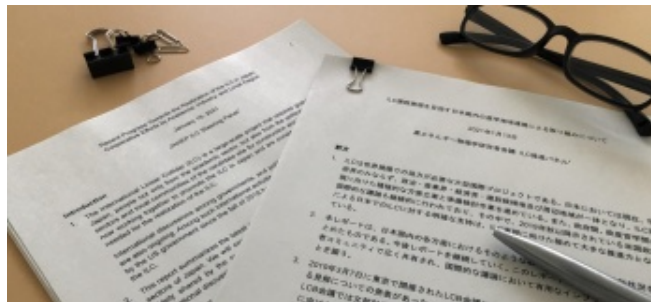




DIRECTOR'S CORNER

Promising reports from Japan

by Andy Lankford

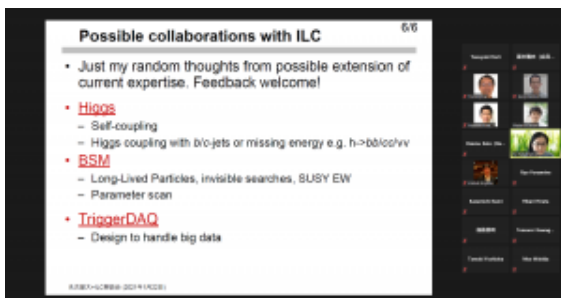


Over the last 15 years, Japanese support for the realisation of the International Linear Collider has grown. People of all stripes — academics, members of industry, artists and everyday science fans—have banded together to voice their support for the building the ILC in Japan. The latest in this wave of support is the formation of a new committee, which recently reported on an impressive set of efforts to promote the ILC, says Andy Lankford, regional representative for the Americas in the International Development Team IDT.

AROUND THE WORLD

Japanese high-energy physics community accelerates ILC effort with new organisation

by Rika Takahashi



Since last October a new panel mandated by the Japan Association of High Energy Physicists will lead the Japanese community by developing and executing ILC promotion strategies targeted to a very wide audience, within Japan and abroad, in view of a timely realisation of the ILC project. Their first report is now available online in Japanese and English.

PROFILE

Amanda Steinhebel wants you to share the joy of particle physics

by Leah Hesla



A summer undergraduate research experience hooked Amanda Steinhebel on particle physics in 2013, and she's never looked back. A doctoral student at the University of Oregon, Steinhebel focuses on one of the detector designs for the International Linear Collider and Higgs boson decays at the ATLAS experiment at the Large Hadron Collider. It's all great fun, she says, but it's even more fun when you share it.

ANNOUNCEMENTS

Registration for LCWS 2021 (March 15-18) is now open

by Steinar Stapnes

The 2021 International Workshop on Future Linear Colliders (LCWS 2021) is scheduled to take place March 15-18, in an online format, arranged by Europe. LCWS 2021, similar to earlier workshops in this series, is a common ILC and CLIC workshop.

A preliminary version of the workshop [Indico page is now available](#). With a wide programme of plenary and parallel sessions, the workshop aims to offer the opportunity for presenting ongoing work as well as for getting informed or, even better, involved. The main sessions and initial programme are available at the [Indico page](#).

The programme will feature progress on the ILC in Japan as a prominent theme and use the ILC International Development Team (IDT) working groups' substructure for sessions to review the progress in accelerator design, detector developments and physics studies. The progress of the CLIC studies within the same areas will also be covered, and most sessions and topics will be common. The registration is now open, and we invite everybody to sign up as soon as possible. There is no fee, but registration is needed to access the sessions.

You are all warmly welcome to LCWS 2021.

Steinar Stapnes, on behalf of the Organising Committee

ANNOUNCEMENTS

Status update for the autumn workshop in Japan

by Tatsuya Nakada

The ILC International Development Team (IDT) will hold a workshop, **Towards ILC Expressions of Interest**, in October 2021 in Tsukuba, Japan, with focus on the experimental programme of the International Linear Collider (ILC). The main goal of the workshop is to start shaping the physics programme of the ILC through the oral presentations of ideas for ILC experiments in a form of expressions of interest (EoI's) by the physics community.

Presentations on the experiments at any stage of development will be encouraged to ensure full exploitation of the ILC physics potential by considering a diverse set of experiments. The workshop will provide an opportunity for ideas at an early stage to build up collaborations and to elaborate further the experimental concepts. This workshop will also be an occasion for well-established groups to refine their experimental setups benefiting from the recent detector R&D and expanding community interest in the ILC. In addition, IDT activities and political developments, as well as local area activities and community efforts in Japan, should be presented. A small number of sessions on the ILC accelerator issues is also foreseen.

Currently, the workshop is planned to be face-to-face by assuming that the COVID situation will be normalised by the time of the meeting. As the venue, [the Epochal Tsukuba International Congress Centre](#) is foreseen. Since there is a finite probability that the COVID situation may not be fully resolved in time, an option of holding the workshop in a hybrid mode with remote participation is envisaged.

See more information in [this document](#).

Tatsuya Nakada, Chair of ILC-IDT Executive Board

IN THE NEWS

from *KITAKAMI TIMES*

28 January 2021

2020: A year of working for the ILC

This year, Iwate kept continuing its support of preparations to bring the ILC to Japan, working with our counterparts across the world as the ILC moves towards the preparatory phase.

from *Asahi Shinbun*

27 January 2021

(村山齊の時空自在) 最先端「リニア加速器」、日本で実現？

このコラムで何度か触れた大型粒子加速器「国際リニアコライダー (I L C) 」を日本に建設する話が世界で盛り上がっている。

from *ibc*

24 January 2021

「100年の謎に終止符」ブラックホール撮影成功の本間さん講演／岩手・一関市

岩手県一関市で23日、市民と研究者が語り合うイベントが開かれ、世界で初めてブラックホールの撮影に成功したチームのメンバー、本間希樹さんが講演しました。—ILCとの関連については「研究分野は違うが大きな目で見れば近い。誘致実現には国民の応援が必要」と話していました。

from *Indian Times*

23 January 2020

Meet Rohini Godbole, The Particle Scientist Who Has Been Honoured With French Order Of Merit

In the past few decades, she's authored over 150 research papers, with another 150 that feature her contributions. More importantly though, she's also a part of the International Detector Advisory Group (IDAG) for the International Linear Collider at the European research lab, CERN.

from *Science Magazine*

22 January 2021

Masatoshi Koshihara (1926–2020)

In 1985, in recognition of these efforts, he received the Great Cross of Merit, the Order of Merit of the Federal Republic of Germany. Koshihara dreamed of constructing the next-generation e⁻e⁺ linear collider in Japan, a vision that will be realized with the completion of the e⁻e⁺ International Linear Collider (ILC).

from *KITAKAMI TIMES*

21 January 2021

Medical Interpreter Volunteers

What if, on a trip overseas, you found yourself getting sick and needed to go to a hospital? What would you do if you couldn't communicate your symptoms or describe your illness?

PREPRINTS

ARXIV PREPRINTS

[2101.08695](#)

Development and performance of a compact LumiCal prototype calorimeter for future linear collider experiments

[2101.03702](#)

Testing aligned CP-violating Higgs sector at future lepton colliders

[2101.01996](#)

Development of novel silicon sensors with high time and spatial resolution

[2101.00864](#)

Kinematic corrections and reconstruction methods for neutral Higgs boson decay to $b\bar{b}$ in 2HDM type-I at future lepton colliders

[2101.00520](#)

Axion-Like Particles at the ILC Giga-Z

[2101.00308](#)

On the evaluation of two-loop electroweak box diagrams for $e^+e^- \rightarrow HZ$ production

[2012.13404](#)

Higgs Production in Association with a Dark-Z at Future Electron Positron Colliders

[2012.11267](#)

Polarised Beams at Future e^+e^- Colliders

[2012.11415](#)

Kinematic Edge Detection Using Finite Impulse Response Filters

[2012.10155](#)

ILC as a SUSY discovery and precision instrument

[2012.09470](#)

Composite Higgs revealed in Higgs pair photo-production at future colliders

[2012.06598](#)

Electroweak precision pseudo-observables at the e^+e^- Z-resonance peak



DIRECTOR'S CORNER

Promising reports from Japan

[Andy Lankford](#) | [31 January 2021](#)

The Japan High Energy Physics Committee, representing the Japan Association of High Energy Physicists (JAHEP), recently established [the ILC Steering Panel](#) to “lead the high energy physics community in Japan to advance the ILC project towards timely realization”. This month the panel produced a most interesting report with a rather long title: “[Recent Progress Towards the Realization of the ILC in Japan: Cooperative Efforts by Academia, Industry, and the Local Region](#).” This new report summarises an impressive set of recent efforts in Japan to promote the ILC by all of the political, industrial, governmental, and academic sectors.

This report recalls the formation nearly 15 years ago of the Federation of Diet Members for the ILC, consisting of over 100 members of the Japanese Diet from across parties, and of the Liaison Committee for Realizing the ILC, formed in 2018 within the Japanese ruling coalition. These two influential bodies, both chaired by the Honorable Takeo Kawamura, have extolled the ILC as a project that cuts across several Japanese national priorities, from science, technology, and innovation to overcoming population decline and regional revitalisation. Members of the federation have also engaged at the international level through numerous visits to the United States and Europe to discuss the ILC with high-level government officials and members of legislative bodies.

Realisation of the ILC is a national priority for many groups in Japan. Key organisations have formed in support of the ILC. For instance, for years [the Advanced Accelerator Association Promoting Science and Technology \(AAA\)](#), an industry-academia collaboration with over 100 companies and 40 academic institutes, has pushed for the ILC. Recently, three major business organisations in Japan have released a joint statement supporting the realisation of the ILC and its benefits as “Asia’s first large international facility in science and technology.” Grassroots organisations have formed, for example the Committee of 100 for the ILC, organised by well-known business and cultural personalities, and the ILC Supporters, which includes well-known artists and well over three 300,000 other ILC supporters.

Naturally, the region of the prospective site for the ILC strongly supports the collider, and the level of support and activity there is impressive. The Tohoku ILC Promotion Council, consisting of members from industries and business, academia, and local government, coordinates many efforts in the region. Last year, as the ILC International Development Team was established, the Tohoku ILC Project Development Center, headed by former KEK Director-General Atsuto Suzuki, was established to address regional issues from environmental assessment to infrastructure development, and there is now much activity on these subjects. Resolutions urging the realisation of the ILC have passed at many levels of local government in the region, and regional representatives have actively urged the Japanese national government at high levels.

To the community of scientists who are eager to harvest the discovery potential of the ILC, it is gratifying to learn of the strong ILC support in Japan and its hearty growth over the last two or three years. Together with the support given to the ILC by the recent update of the European Strategy for Particle Physics and the ardent encouragement of the U.S. government, we can grow ever more optimistic that Japan and partner nations will decide to proceed with the realisation of the ILC. Meanwhile, we look forward to progress by the JAHEP ILC Steering Panel.

The JAHEP ILC Steering Panel is chaired by Professor Satoru Yamashita of the University of Tokyo. Its mandate and membership can be found [here](#), and its report, “[Recent Progress Towards the Realization of the ILC in Japan: Cooperative Efforts by Academia, Industry, and the Local Region](#),” is worth a read!

About the author: Andy Lankford is Distinguished Professor at University of California, Irvine. His current research is on the ATLAS experiment, where he was Deputy Spokesperson for LHC turn-on and the discovery of the Higgs boson. He chaired the U.S. High Energy Physics Advisory Panel from 2012-2018, when it formed the current strategic plan for U.S. particle physics advocating strong international partnerships and the great potential for the field if each major partner hosts a unique world-class facility at home and partners in high-priority facilities hosted elsewhere. He has advised and assisted the U.S. Department of Energy in its international collaborations. He anticipates that the strong support for the ILC in Japan on the part of the U.S. government will continue in the administration of President Biden.

[JAHEP](#) | [JAPAN](#) | [TOHOKU](#) | [US](#)

AROUND THE WORLD

Japanese high-energy physics community accelerates ILC effort with new organisation

Rika Takahashi | 31 January 2021

On 28 October, Japan's high-energy physics community took a big step. The Japan Association of High Energy Physicists (JAHEP) announced the establishment of a new organisation called the ILC Steering Panel. The panel's mandate is to lead the community in the timely realisation of the ILC project by developing and executing ILC promotion strategies in cooperation with other scientific communities, governmental authorities, legislators, corporate leaders, regional governments, and media, as well as international communities and authorities.

"I believe it is very important to build a good research environment where scientists, especially the younger generation, are able to work on the research challenges together," said Satoru Yamashita of University of Tokyo, who chairs the new panel. "By spreading the news and sharing the information about the research that can be done at the ILC, we plan to grow support and momentum for this global project."

The panel has wasted no time getting to work. Their first goal has been to acquaint the research community with ILC's rich physics programme. They have begun setting up round-table discussions at universities in Japan, talking over possible research themes and strengthening communication toward future joint research. This effort has already begun with round-table sessions at Hiroshima University and Kyushu University in December 2020 and at the Nagoya University last week.

"Both sessions got really lively, and most of the participants enjoyed the sessions and wished to continue the discussion," said Masao Kuriki of Hiroshima University, who leads this effort. "If there were interesting research topics, the discussions kept going, without prompting. We need to keep up the momentum, so we plan to provide topics and information for further discussion."

The panel plans to have those sessions once or twice a month over the next six months.

The ILC Steering Panel is also working to communicate to the world the activities of both the ILC project and the proposed site of the collider, since the ILC is a large-scale project for which global cooperation is essential.

"There are many activities in Japan surrounding the ILC project in various sectors, such as politics, industry, business, academia, and those specific to the candidate site. Those activities should be made to be known widely to the world," Yamashita said.

For this purpose, the panel has just published the report "[Recent Progress Towards the Realization of the ILC in Japan: Cooperative Efforts by Academia, Industry, and Local Region](#)".

The report summarises the latest status of efforts towards the realisation of the ILC, including the political activities, the key players in gathering ILC support, the promotional activities in the candidate construction site and topics of international discussions.

Panel members encourage all to share the report with research communities around the world as useful input for important discussions about this crucial future collider.

The ILC project status will also be updated on [the panel website](#).

[Full text of the report \(English\)](#)

[Full text of the report \(Japanese\)](#)

[ILC](#) | [ILC SITE](#) | [JAPAN](#)

PROFILE

Amanda Steinhebel wants you to share the joy of particle physics

Leah Hesla | [31 January 2021](#)



Amanda Steinhebel stands near the ATLAS detector at CERN's Large Hadron Collider.

The lure of particle physics was strong with Amanda Steinhebel in 2016, when she was just starting as a doctoral student at the University of Oregon in the United States. It was halfway through her first year of grad school, and she was trying to convince herself that it was better to pursue research in something other than particle physics — perhaps in a field that was seen as less esoteric, more down-to-earth.

“I knew I wanted to get into high-energy physics, but I was trying to be ‘responsible,’” Steinhebel said. “I thought, ‘I should do something where the work is more tangible.’ I spent the first half of my year at school trying to talk myself out of particle physics, and I couldn’t do it. I ended up studying HEP anyway.”

Since then, Steinhebel has conducted research on both the International Linear Collider and the ATLAS experiment at CERN, a path that’s enabled her to find physics connections between the two efforts and to create human connections in the community.

It happened one summer

Led by curiosity and a childhood fan of Bill Nye the Science Guy, Steinhebel always knew she wanted a career in science. She majored in math and physics at the College of Wooster in Ohio, a small school with a student population of 2,000. To broaden her studies, she spent every summer of her undergraduate career in physics research internships.

“I went out of my way to learn about modern physics research,” Steinhebel said.

In the summer of 2013, she studied neutrinos as part of a University of Colorado internship focused on the international, Fermilab-hosted Deep Underground Neutrino Experiment, known then as the Long-Baseline Neutrino Experiment. The experience hooked her on particles.

“That was my first taste of a high-energy physics experiment,” she said. “It was the hands-on research experience that I had that I enjoyed the most.”

In 2015, she began her graduate studies at the University of Oregon, eventually joining the laboratory of Professor Jim Brau, Linear Collider Collaboration associate director, to continue plumbing the particle world. She expects to earn her PhD in 2021.

Collisions and connection

During her first two years at the University of Oregon, Steinhebel threw herself into R&D on particle detection at the ILC. She studied the physics consequences of the design of SiD, one of two particle detector concepts under consideration for the collider. Her specific focus was on a component called the electromagnetic calorimeter, which uses fine-grained silicon detectors to record the energies of electrically charged particles that emerge from particle collisions inside the detector. For example, she simulated how changes in the detector’s geometry might affect the development of particle showers that appeared in the calorimeter.

Then, in her third year, Steinhebel turned her attention to the ATLAS experiment at CERN's Large Hadron Collider, focusing on an aspect with a tie-in to the ILC: the Higgs boson, the particle that confers mass to matter. The Higgs boson is one of a number of particles that are produced by collisions at the Large Hadron Collider, albeit rarely, and it transforms into — or decays into — other particles. Steinhebel focused on the decay of Higgs bosons into particles that escape detection, a process called Higgs-to-invisible-particles decay. At ATLAS, scientists can narrow the range of parameters that describe these invisible particles, but only to a point. And that's where the ILC will come in handy.

"At ATLAS, we won't necessarily be able to measure this process precisely, but if we could build the ILC, we could basically turn it on and immediately approach the limit of the invisible particles we want to measure," Steinhebel said. "So we're considering the same general physics processes in these two different environments, looking into the intricacies that go into both measurements."

Her ATLAS work took her to CERN, located near Geneva, Switzerland, for almost three years. While there, she visited the German laboratory DESY to further her earlier work on the ILC's SiD detector design. Researchers were testing a high-granularity silicon detector that uses a readout chip developed for SiD (so-called KPiX for its thousand pixels), and Steinhebel got to study the response of the chip using a test particle beam at DESY.

"That was a really fulfilling sort of full-circle moment," she said.

Taking particles to the people

Steinhebel connects more than developments in particle physics experiments and science facilities. She's also eager to connect the people who make it possible to each other and to science fans.

At a recent ILC workshop hosted by SLAC National Accelerator Laboratory, for example, she served as a voice of the community of young scientists who had worked or wanted to work on ILC research. Her role was to make sure early-career scientists felt welcome by established members of the ILC collaboration, to facilitate discussions between senior scientists and junior researchers, and to ensure the younger contingent's questions about the project were heard and addressed.



Amanda Steinhebel takes a seat in Einstein's lap in Washington, DC.

"There were young scientists who are maybe on the outside looking in. The ILC physics case has been made pretty clear, but, I think for a lot of people, there are still questions of pragmatism," Steinhebel said. "Can we at this early stage in our career divert it to this path the ILC is on? Are there postdoc opportunities to pursue?". It said a lot about the conference that we were having these discussions and that people were willing to listen."

It was also a testament to the tight-knit nature of the ILC collaboration, which, for Steinhebel, is one of the most enjoyable aspects of working for the ILC. Even when the focus of her research shifted a few years ago from the International Linear Collider to ATLAS, she continued following ILC developments.

"I was able to stay within the community and keep tabs on what was going on. The collaboration is tight-knit, and everyone has a good handle on what's going on," Steinhebel said. "Even as a newer student, I was able to absorb the big picture in the ILC environment in a way that you can't really replicate in a large experiment."

That kind of good communication should extend to those outside the circle of scientists working on the collider, Steinhebel says, and even into the general public.

"We need to present the science in a way that makes sense to everyone, not only to show the value of the ILC as a project we want to push forward, but also because, being scientists who live in the world, we should want to share our work broadly," she said. "This is important to the first degree within our community, especially the ILC community. I think there's some degree of responsibility — that we're able to bring down our pretension, bring down the level of detail, and communicate our work to anyone."

Engaging with the public not only brings people around to the ILC as a valuable tool for discovery, but it can enhance the scientists' own experience by creating a connection that breaks down the us-them mindset.

Steinhebel herself has done science outreach in physics classes at high schools and at her alma mater.

"I find a lot of value in the casual conversation with the person at the bus stop," she added. "Scientists are real, approachable people, and we have crazy ideas, but we can tell you our crazy ideas, too. You can be in on the crazy."

Strengthening support for the realisation of the ILC

Rika Takahashi | [31 January 2021](#)

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