

The Nordic Summer Colloquium on

# Advanced Steel

The region of Bergslagen Sweden 8–19 August 2016

**NSCAS  
2016**

**A Technologically  
Advanced Country**  
**Create Valuable Contacts**  
**Global Leading Groups**



# Welcome to the Heart of Steel

The Swedish iron and steel industry has a long history, beginning in the Middle Ages. Since then, the cooperation between highly specialized, small companies, industry and academia has developed and embraces a unique competence of techniques for processing steel with a worldwide market. The Nordic Summer Colloquium on Advanced Steel, NSCAS, is a part of that history from now and in to the future. We invite young scientists to take part of that strong tradition of high-tech development and join an international network of companies and fellow scientists in NSCAS.

I am confident that all participants in NSCAS will have a great time, and the opportunity to make connections for a fruitful future.

Jan Andersson,  
Director,  
Triple Steelix 2.0



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## The Nordic Summer Colloquium on Advanced Steel, NSCAS

The region of Bergslagen Sweden 8–19 August 2016

The Triple Steelix Industrial Region hereby invites you as a PhD-student within the fields of metallurgy, processing, properties or use of advanced steel, to join in for two week of talks, meetings, lectures and research exchange. A maximum of 15 PhD students are invited to take part in a fortnight full of inspiring activities.



We will take care of you from your arrival in Borlänge until the day of departure. Lodging, food (scheduled days) and transports within Sweden are included. The week will have a dense programme including exchange of information with scientific poster sessions, lectures and plant visits.

**A unique opportunity to meet renowned experts and academics from leading Swedish steel companies and universities:**

- Present your work to renowned experts.
- Visit leading Swedish steel companies.
- Participate in state of the art lectures.
- Enjoy a variety of social activities.
- Make valuable connections and get to know young researchers from all over the world.

# Sweden

## – A Technologically Advanced Country

Photo: Patrik Olsson/SSAB Borlänge



All Swedish steel companies are now international, many truly global.



The wild and undisturbed nature invites to lots of different outdoor activities.

**NSCAS will take place in the area of Bergslagen in the heart of Sweden. All that was needed to build an iron industry was found in this area; mountains with resources of ore, forests and water for energy supply and transport. From small and humble beginnings the industry grew increasingly and became large and significant.**

By the 16th century Sweden had evolved into a strongly centralized nation. During the 17th century the country was one of the great powers in Europe. Since 1812 our borders have been unchanged and Sweden has not participated in any war in almost two centuries.

– Despite our large area and small population, Sweden is a technologically advanced country with good infrastructure, says Pasi Kangas, Vice President and Head of R&D, Sandvik Materials Technology.

### **Bergslagen – Sweden’s Industrial Cradle**

Bergslagen constitutes Sweden’s industrial cradle. The beginnings of industrial development were to be found here in the 12th century.

– The 19th century was the golden age for Bergslagen, continues Pasi Kangas.

Around 1850 Sweden accounted for three quarters of Great Britain’s import of iron. Sweden accounted for a total of one third of Europe’s entire iron production.

Today, the steel industry employs close to 50 000 people in Sweden, partly in the steel enterprises and indirectly in different supplier companies. The steel industry generates large export and tax revenues, contributing largely to Sweden’s GDP and welfare investments.

– The steel industries significance for our prosperity, along with other Swedish export industry, can not be overemphasized, Pasi Kangas stresses.

All Swedish steel companies are now international, many truly global, and a range of factors influence whether a corporate management will make their next investment in Sweden — or in another country.

### **Living in Bergslagen**

In 2016 Bergslagen still represents the heart of the Swedish steel industry. Here a comprehensive excellence has developed over the years. But the modern Bergslagen also has a lot to offer as a place to visit and to live and work, as an individual or as a family. Housing is

often beautifully located and with a high standard while public transport is well developed.

The cultural life has a long tradition and the region has raised many well known musicians, such as Mando-Diao and renowned painters such as Anders Zorn and Carl Larsson. The cultural life is rich and flourishing.

The wild and undisturbed nature invites to lots of different outdoor activities. Hiking in the woods and mountains or enjoying the lakes in the summer and in the winter, skating and skiing in the open landscape. The world famous ski competition “Vasaloppet” FIS Nordic World Ski championships take place here.



Pasi Kangas, Sandvik Materials Technology.

# Small Local Businesses Became Global Leading Groups



Larz Ignberg, Triple Steelix.

The steel companies in Bergslagen are specialized in various product segments where they manufacture high value-added steel grades and products. Many of the companies are world leaders on the international market.

Most steel companies in the region dates back not only decades, but hundreds of years. Today they have all transformed into modern corporations with expertise within their specialist areas.

– This development puts high demands on corporate research and development departments, says Larz Ignberg, project leader, Triple Steelix and one of those responsible for NSCAS.

## All Over the World

Larz Ignberg tells that some of SSAB's main products include sheet metal, with a focus on high-strength properties and durable designs and that SSAB produces about 5.7 million tonnes of ore based crude steel per year (2010).

– Outokumpu is a Finnish owned steel company that manufactures stainless steel and is represented in 30 countries as well as in several locations in Bergslagen.

Ovako produces low-alloy and carbon steels in the form of bars, tubes, rings and pre-components.

– All steel made from recycled scrap is refined and turned into hot- and cold-rolled intermediates for further processing into final shapes.

## Advanced Materials Research

One of the world's largest manufacturer of indexable tools is SECO Tools. The main facility is located in Fagersta. SECO Tools is represented in 60 countries and has more than 50 wholly owned subsidiaries Sandvik is a Swedish global industrial group with sales in over 150 countries and world-leading positions in selected niches.

– In Sandviken, extensive production and advanced materials research, mainly focusing on optimized steel for special applications is taking place.

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## NSCAS – An Opportunity for Companies to Gather Experts in Interesting Areas

In the 2015 NSCAS the companies below participated in various ways and summarised their experience as follows:

*Very good initiative, good for the students and good for the company. From the company perspective there was an outlook also into other close research areas, which is always interesting. One of the student has continued contacts with the company.*

**Mikael Fallqvist, Ph.D., Research Scientist, Insert Tools/Grades and Cutting Metallurgy, SECO Tools**

*Good size of the group. Large range of specialities preferred. Very nice, fun arrangement, a new way to work!*

**Simon Lille, Ph.D., Production Manager, Steel Mill Bar, Ovako**

*Two students have been in discussions with company researchers on specific topics.*

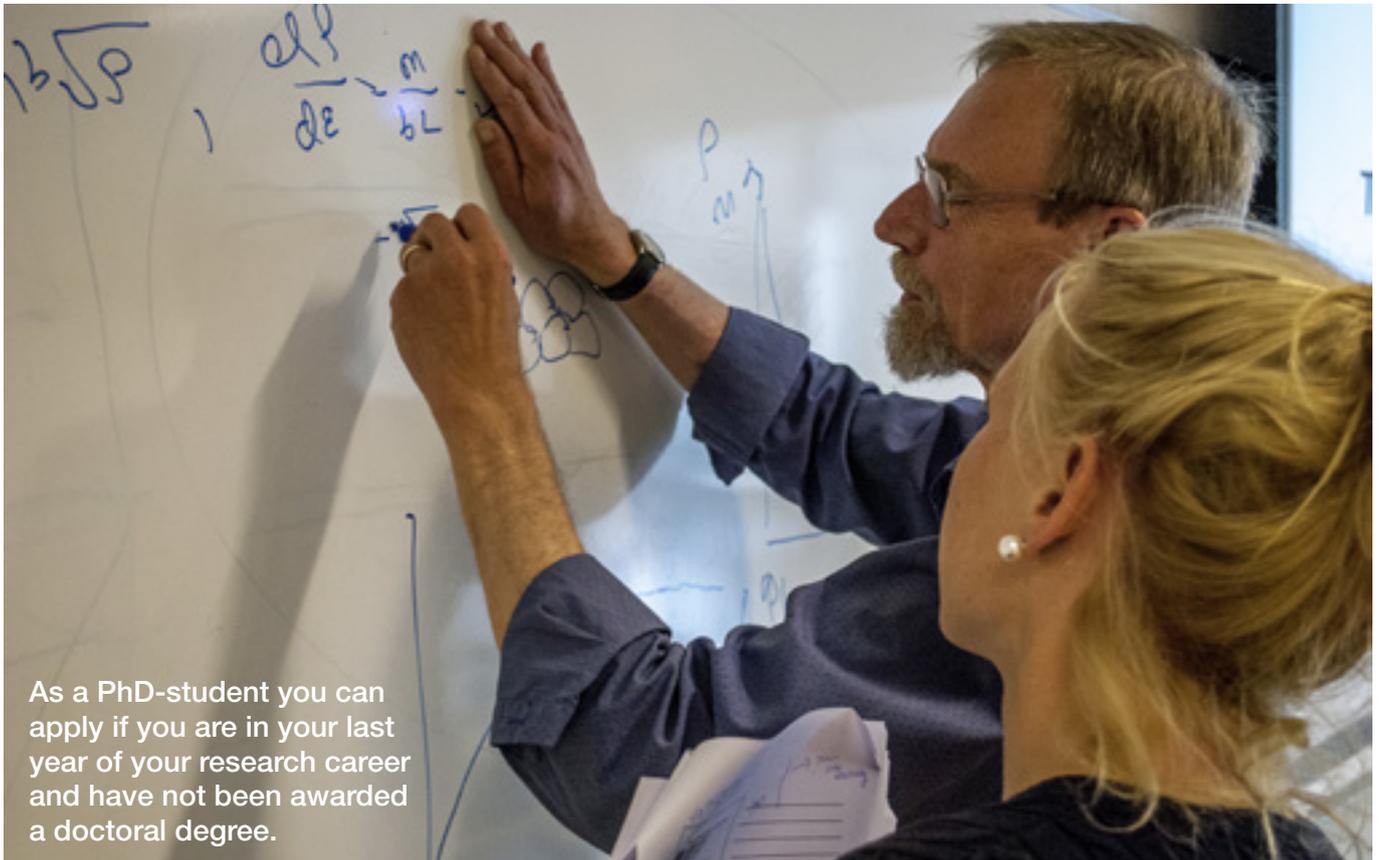
**Erik Schedin, Department Manager, Product Development and Design, Outokumpu**

*The concept with lectures, presentations and posters was much better than expected. Regarding competence profile it would be interesting with some students in the areas of high alloyed and/or high temperature materials.*

**Pasi Kangas, Vice President and Head of R&D, Sandvik Materials Technology, Sandvik**

*All in all a very good arrangement. A good initiative and an opportunity for the company to gather experts in interesting areas. There was a good fit to SSAB's needs since several PhD-students were connected to the former steel supplier Ruukki in Finland, recently acquired by SSAB. Good interaction between students and SSAB personnel. Ongoing contact between SSAB and some of the students.*

**Lars Troive, Adj. Prof., Senior forming Specialist, Knowledge Service Center, SSAB**



As a PhD-student you can apply if you are in your last year of your research career and have not been awarded a doctoral degree.

# Discuss Your Work – Create Valuable Contacts

During the NSCAS you as PhD-student will get the opportunity to show your current research projects and discuss your ideas with experts from universities and leading steel companies – a unique opportunity to create valuable contacts for the future.

The NSCAS will also create and maintain positive relations with the participants in order to facilitate future hiring of experts and researchers to the region's industry and academia. The NSCAS can become a valuable experience and driving force for research work.

– Our former students have all established contacts with participating companies during the week, says Elisabeth Dahlstedt, project leader, Triple Steelix.

## Discuss and defend

During the colloquium, you should be able to present your current research activities in the form of a scientific poster submitted to the colloquium.

– The student will also have the opportunity to discuss and defend the scientific contents of the submitted scientific poster in the presence of an audience of professional research engineers and scientists, Elisabeth Dahlstedt continues.

## Prepare yourself to

- Orally present and discuss your current research activities as presented on the submitted scientific poster, in front of an audience of professional research engineers and scientists.
- Reflect on your participation in, and experiences of, the colloquium in a written essay.

# You Have to Be Able to Deliver

The scientific talk, like the scientific paper, is part of the scientific communication process.

– The modern scientist must be able to deliver a well organised, well delivered scientific talk. That is to make the right connections and find the best industrial applications, says Elisabeth Dahlstedt, project leader, Triple Steelix.

During the NSCAS weeks you will have the opportunity to meet with industrial scientists and business representatives, individually and in group to discuss your research topic and put it in a wider context. You will also gain insight into the terms of the industrial research and how it is to work with development of products and in the industry's need for new initiatives. To prepare and feel comfortable for these meetings, you will have the opportunity to practice oral presentation in a relaxed atmosphere.

– Participants in NSCAS will both receive coaching and feedback on their posters and their oral presentations, continues Elisabeth Dahlstedt.

## Important to Reach Out

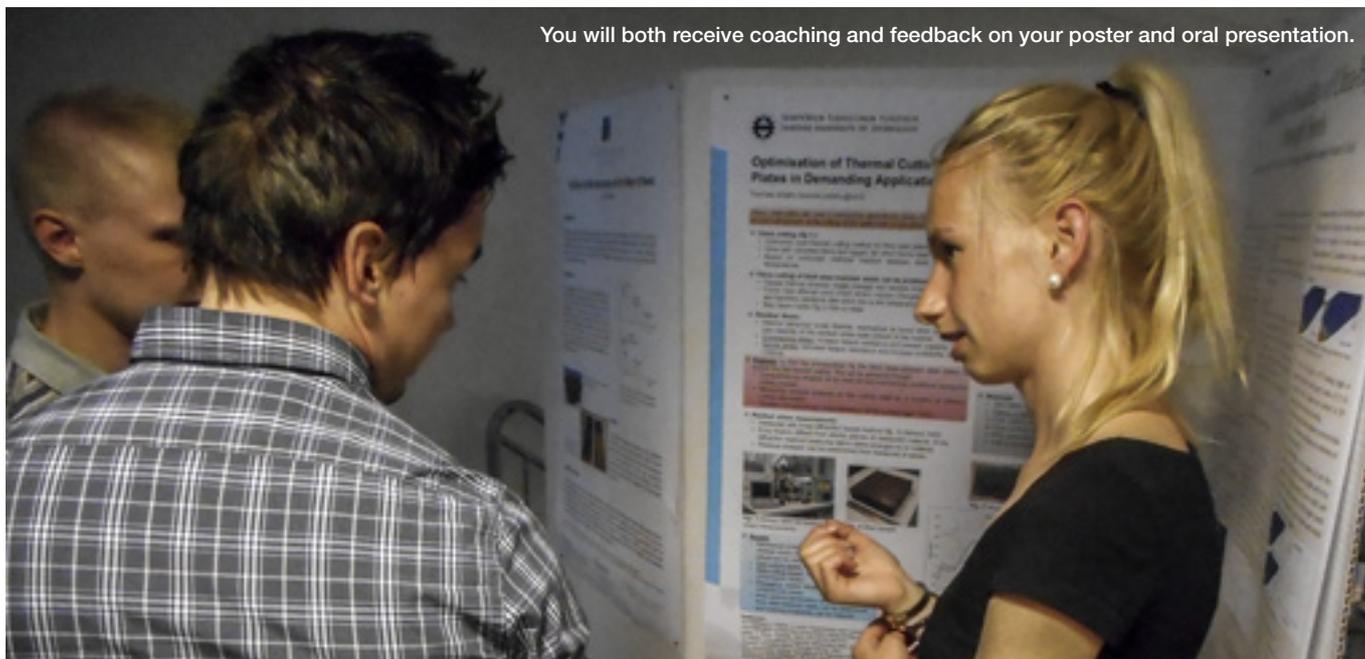
As an industrial researcher, it becomes increasingly important to have the ability to reach out with your

message, both in writing and orally. The reason is that research and innovations quickly need to convert into new technologies and new business models.

– By practicing presentation techniques our students become able to promote themselves, their universities and their research in a professional way, says Elisabeth Dahlstedt.

## 10 Tips for a Better Oral Presentation

1. Prepare your material carefully and logically.
2. Practice your talk.
3. Don't put in too much material.
4. Avoid equations.
5. Have only a few conclusion points.
6. Talk to the audience not to the screen.
7. Avoid making distracting sounds.
8. Polish your graphics:
  - a. Use large letters (no fonts smaller than 16 pts!)
  - b. Keep the graphic simple.
  - c. Use colour.
  - d. Use cartoons
9. Use humor if possible.
10. Be personable in taking questions.



# New Contacts and Ideas

NSCAS can become a valuable experience and driving force for research work. Former students want to see a continuation of NCAS in the form of network and follow-up activities.

– They have all established contacts with the participating companies during the week, says Elisabeth Dahlstedt, Triple Steelix.



Elisabeth Dahlstedt, Triple Steelix.

## Interesting and educating

*I find that the week has been highly interesting and educating. In my opinion the best thing about this week has been gaining new contacts and new ideas for my studies. Moreover, it has been highly interesting and useful for us to get to understand what kind of knowledge various company needs.*

**Mia Liimatainen**

## Nice atmosphere

*The team work in the robot contest at the science centre, The Future's Museum, was a good way of creating a nice atmosphere for all the participants. I also really enjoyed the visit to the copper mine in Falun. Interesting stories and legends from the mine and interesting to knowing were the metallurgy business in Sweden started.*

**Raul Chinchilla Adell**

## An excellent opportunity to see the Swedish leading steel companies

*This was a great experience and trip. We had an excellent opportunity to see the Swedish leading steel companies. It was great to learn and hear their applications and products. There were not strictly related to my studies but good information about material science and steel industry.*

**Tuomas Jokiahio**

## A total success

*Two lectures were held at Dalarna University by professors Mikael Olsson and Göran Engberg Olsson's lecture was interesting to me as it was fairly close to my field of study. His delivery was very lively and easy to*

*follow. I had the chance to chat with him and got some ideas for my own work as well. The wear lecture was a total success on my point of view.*

**Oskari Haiko**

## I have been able to learn

*It is difficult to interact with international researchers unless taking part in a conference. But in conferences there are so many people to talk to and so little time to actually share insights on scientific problems in depth. During this week I have been able to learn more about the research topics and needs from steel industry which are often more practical problems.*

**Anna-Maija Arola**

# Research Interests 2015

Swedish steel companies are world leaders within several different market niches with their advanced steel. Therefore, the team behind NSCAS particularly welcomes students who have the focus within the field of metallurgy, processing and properties of advanced carbon, low alloy and stainless steel in their research.

Previous students have been focused on:

- Material Engineering, Steel manufacturing and Stress Analysis
- Material modelling, forming, materials characterization
- Hardening processes, material modelling, simulation of hardening
- Materials uses in the aerospace and automobile industry. Tribology. Steels.
- Wear-resistant steels, metallurgy, advanced steels, ultra-high strength steels, steel processing and heat treatments.
- Thermal cutting of thin wear-resistant steel plates. Characterization and residual stress measurements of the cut edge.
- Heat treatments, automotive steels, high strength steels, coatings, scanning electron microscopy, EBSD (Electron Back Scattered Diffraction) methods, mechanical testing, high strain rate testing.
- Formability of structural and wear resistant high strength steels



(YS>700 MPa). Effects of microstructure homogeneity, surface hardness, texture, austenite morphology and dislocation density on formability. Influence of various manufacturing methods (e.g. DQ, DQ+T, conventional quenching) and chemical composition on microstructure and bendability.

- Real industrial applications, application oriented wear testing, surface characterization.

All participating companies agree that they want to participate in the planned NSCAS programs during the coming years.

# How Do I Apply?

You can apply if you are in your last year of your research career and have not been awarded a doctoral degree. Your studies should be targeted towards for example metallurgy, high-strength steel materials or stainless steel. You must have the ability to present current research achievements, both in the context of a poster session and in oral presentations in plenum in front of an audience of professional research engineers and scientists.

- Fill in the application form on [www.nscas.se](http://www.nscas.se) and submit an abstract describing your current research before Monday April 25 2016.
- Invited participants, selected based on the quality and relevance of their research, must fill in the final application form and pay the registrant fee on SEK 3 400 (approx. EUR 340) before Monday May 9.
- Bring a poster in A1-format for the poster session. We will be happy to print it for you if you submit it in digital form no later than Monday May 30.

## For further information, please contact:

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NSCAS is organized by Triple Steelix in cooperation with industries in the region:



With appreciated support from  
the Futures Museum (Framtidsmuseet) Science Center in Dalarna  
and the Dalarna University (Högskolan Dalarna).



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