

Curriculum vitae

Name: Bo Sundman

Born: 23 August 1947 in Stockholm, Sweden

Nationality: Swedish

Exams: Master in Physics Engineering 1974

at the Royal Institute of Technology (KTH), Stockholm.

PhD in Physical Metallurgy 1981 at KTH.

Docent in Physical Metallurgy 1987 at KTH.

Employments: Research Associate at KTH 1981-1987.

Lecturer in Physical Metallurgy 1987-1994.

Head of the Division of Computational Thermodynamics within the

Department of Materials Science and Engineering at KTH from 1993.

Associate professor in Physical Metallurgy at KTH from 1994.

Professor in Computational Thermodynamics at KTH from 2002.

Senior researcher at CIRIMAT, ENSIACET in Toulouse, France 2006-09.

Visiting professor at ICAMS, Ruhr University Bochum, Germany 2009.

Visiting professor at INSTN, CEA Saclay, France 2009.

Awards: The Gibbs Triangle from the Calphad Society in 2002

The Hume-Rothery Prize 2005 from the Institute of Materials, Minerals and Mining.

Web page: <http://www.mse.kth.se/~bosse>

Current activities: Member of the Editorial board for the Calphad Journal.

Publications: more than 140 papers published in international scientific journals,

A book *Computational Thermodynamics, the Calphad Method*, Cambridge University Press, ISBN-9780521868112, together with Dr Leo Lukas and Dr Suzana G Fries.

My research activities have been concentrated on modelling thermodynamic properties of materials. In 1981 I presented my thesis with the title "Application of Computer Techniques on the treatment of the Thermodynamics of Alloys" for the doctorate in Metallurgy. I worked as research associate of Professor Mats Hillert at the department of Physical Metallurgy from 1981 to 1987 and as lecturer from 1987 to 1994 and during this time developed the Thermo-Calc software together with several coworkers. Thermo-Calc is now the most used thermodynamic software for alloys in the world. Thermodynamics describe the stable state of a system but the modelling in Thermo-Calc makes it possible to extrapolate chemical potentials and other quantities to meta-stable states and this makes it very useful for simulating phase transformations like in the DICTRA software developed by Professor John Ågren at the same department. This has lead to several extensions of Thermo-Calc to handle for example solidification simulations according to the Scheil-Gulliver model, para-equilibrium phase diagrams etc. Since 1993 I am manager of the division of Computational Thermodynamics (CT) within the department of Materials Science and Engineering (MSE) with currently two post-docs and one graduate student. During 2006-09 I was on leave to

work for CNRS at CIRIMAT, ENSIACET in Toulouse, France. In 2009 I spent 3 months at ICAMS, Ruhr university Bochum in Germany as visiting professor. From September 2009 I will be visiting professor at INSTN, CEA Saclay in France.

In Europe SGTE (Scientific Group Thermodata Europe) has coordinated much of the work on development of thermodynamic databases and I have participated in this work since 1982. I have worked abroad many times for longer or shorter periods, as for instance in Japan for six months in 1988 with Dr Tooru Matsumiya at Nippon Steel R&D Lab 1 in the “Future and Frontier Research group” with phase transformation simulations based on thermodynamics. I have worked as visiting researcher for periods of one to three months at several places like with Dr Rand at AERE Harwell, UK in 1983 and Dr Barry at NPL Teddington, UK in 1985, with Dr Murray at NIST in USA in 1987 and Professor Jin at Central South University, China in 1989. I have worked in France several times for 1-3 months mainly with the late Professor Ansara at LTPCM in Grenoble between 1978 to 1998 and with with Professor Hertz at University at Nancy in 1993, with Professor Bros at IUSTI in Marseilles in 1995 and Professor Servant at Universite de Paris Sud in Paris in 1997 and 2005. I was at the Max Plack Institute für Werkstofforschung in Stuttgart the whole of 1994 and visited Professor Ohtani at the Tohoku University in Sendai, Japan for 3 months during 1998, Professor Phuti at University of the North, South Africa for one month in 1999 and the Faculty for Chemical Engineering in Lorena, Brazil for 6 weeks during 2001.

The interest in improved mechanical properties of multicomponent alloy systems have lead to the development of extensive modelling capabilities in the Thermo-Calc software for ordered phases. This has lead to many collaborations with ab initio calculations and at MSE there is now a separate division dealing with first principle calculations in collaboration with CALPHAD applications with professor Brje Johansson as leader.

I was initiator and manager for 10 years of the Swedish materials research consortium called CAMPADA during 1990-2000. CAMPADA consisted of several universities and industries interested in developing thermodynamic and kinetic databases for different types of materials and it tried also to integrate other applications of thermodynamics like aqueous solutions, combustion and nuclear fuels.

There are several international projects I have participated in like the COST-507 for light materials, the Brite-Euram SUPERDATA project for superconducting oxides and the recently finished FP5 project VESPISM for integrating thermodynamics in phase field simulations of microstructure development in steels. Currently I participate in COST 531 for solder materials, COST 535 for intermetallics, in the FP6 integrated project IMPRESS and the ACTINET and CMA networks.

I typically participate in 4-6 conferences each year, for example the Calphad conference, the annual TMS conference, the Thermodynamics of Alloys meeting, EUROMAT, “Journées d’Etude des Equilibres entre Phases” (JEEP), the “Symposium on Nuclear Materials” (STNM). I am often invited to give lectures to more conferences but the last years I have tried to decrease the number of travels.

Each year there are one or two visiting scientists at my division who come to learn about

modelling and assessments. Most recently Dr Joubert from Institute des Sciences Chimiques Seine-Amont, France stayed at the division for 18 months and Dr Taichi Abe from NRIM, Japan for 12 months. In 2005 Dr Jianshin Wang from Xiangtan University, China visited the division for 9 months.

I have been teaching an undergraduate course in “Construction Materials” for 250 students in their second or third year in mechanical engineering for several years. The course consists of 18 lectures and 5 laboratory sessions. I have also developed and teach a course for undergraduate called “Materials Design” for the last years students in materials science at KTH. This is a project oriented course where the students learn to use software tools like Thermo-Calc, DICTRA, MATLAB etc in order to find ways to improve the properties of materials.

I have developed and teach a graduate course in “Computer Modelling of Equilibria and Phase Diagrams” since many years. A short version of this course have also been given several times outside Sweden for example in 1993 at Monash University in Melbourne, Australia, in 1994 at Max Planck Institute, Germany, in 1995 at LTPCM in Grenoble, France, in 1996 at NTNU in Trondheim, Norway, 1997 at AERE Technologies in Pittsburg, USA, in 1998 at Tohoku University, Japan, in 1999 at University of the North in South Africa, 2001 at the Faculty for Chemical Engineering in Lorena, Brazil, in 2004 in Jagiellonian University in Krakow, Poland and 2006 at CIRIMAT Toulouse and KTH in Sweden and again 2008 at KTH.

Since January 2006 I am on leave from KTH to work as senior researcher at CIRIMAT, ENSIACET at Paul Sabatier University in Toulouse, funded by CNRS in France as the funding for my research in Sweden dried up. During this period I have had the opportunity to finish the book, “Computational Thermodynamics”, together with Dr Leo Lukas, now retired from Max Planck Institute in Stuttgart and Professor Suzana Fries, now an independent researcher in Germany.

I have found the research environment outside Sweden very good as senior univeristy staff are permanently employed full time and teach less than 400 hours/year. This gives more time to make high quality research compared to my situation in Sweden where I had to find external funding for my own salary as well as my students.

I have been main adviser for six PhD and two Tekn.Lic. thesis:

Assessment of ternary systems with silicon, Tekn.Lic. by Mikel Lindholm, October 1996.

Computational tools for the Simulation of Phase Transformations, Ph.D. by Mikael Schalin, March 1999.

Development of an improved Steel Database Tekn.Lic. by Nihad Subasic, May 2000.

Modelling of Ordering in Metallic Systems Ph.D. by Alexandra Kusoffsky, April 2002.

Phase Diagram Evaluation and Applications in Light Metal Alloys Ph.D. by Åke Jansson, May 2002.

Theoretical Modelling of Molar Volume and Thermal expansion Ph.D. thesis by Xiao-Gang Lu, June 2005.

Thermodynamic modelling and assessment of some alumino-silicate systems Ph.D. thesis by HuaHai Mao, June 2005.

Development of a Database for zirconium alloys, Ph.D. thesis by Rosa Jerlerud-Perez, May 2006.