

# CURRICULUM VITAE

**NAME** : Tor Anders Nygaard  
**YEAR OF BIRTH** : 1961  
**LANGUAGES** : Norwegian, English and German  
**POSITION** : Senior Research Scientist and Professor  
**CV UPDATED** : October 14, 2009



## KEY QUALIFICATIONS

- Aerodynamics, atmospheric flow, fluid/structure interaction
- Computational Fluid Dynamics(CFD), Computational Structural Dynamics(CSD) and development of computational tools
- Wind monitoring and siting of wind turbines
- Professor in mechanical engineering

## EDUCATION

### 1995 - 1998:

Dr.Ing.(PhD) at the Faculty of Mechanical Engineering, Department of Applied Mechanics, Thermo and Fluid Dynamics, the Norwegian University of Science and Technology, Trondheim, Norway. Dissertation: Nygaard, T.A.(1999). *Optimization of Wind Turbine Rotors*. PhD. thesis, the Norwegian University of Science and Technology, Trondheim, Norway. ISBN 82-471-0472-5

### 1980 - 1985:

Siv.Ing.(MSc) at the Faculty of Mechanical Engineering, Department of Aero- and Gas Dynamics, the Norwegian University of Science and Technology, Trondheim, Norway. Master thesis at the Faculty of Mechanical Engineering, Institute for Jet Propulsion and Turbomachinery, Aachen University of Technology (RWTH), Aachen, Germany: "The

effects of correlations for slip-angle and stagnation pressure losses for subsonic axial compressors within a through-flow computational procedure", (in German; title translated from the original thesis).

## **PROFESSIONAL EXPERIENCE**

### **October 2009 – Present: Senior Research Scientist**

Institute for Energy Technology (IFE), P.O. Box 40, 2027 Kjeller, Norway

### **July 2006 – Present: Professor**

Norwegian University of Life Sciences (UMB), P.O. Box 5000, 1432 Ås, Norway

### **December 2000- July 2006: Research Scientist**

Eloret Corp, NASA Ames Research Center, MS 215-2, Moffett Field, CA 94035-1000

- Development, implementation and validation of aero-elastic capabilities and a fluid/structure interface in the flow solver OVERFLOW2.
- Implementation and validation of a momentum disk model in OVERFLOW2.
- Implementation of run-time particle tracing and co-processing routines in OVERFLOW2. The routines are coded with FORTRAN90 and MPI.

### **January 2001 – July 2006: Professor (20% position)**

Norwegian University of Life Sciences, P.O. Box 5000, 1432 Ås, Norway

- Revision of Curriculum in Mechanical Engineering
- Teaching parts of the classes “Finite Element Design”, “Machinery and Product Development” and “Process Technology II”.

### **November 1986 – December 1999: Section Head/ Principal Research Scientist/ Research Scientist**

Institute for Energy Technology (IFE), P.O. Box 40, 2007 Kjeller, Norway

- Developed and coded the Navier-Stokes solver 3DWind, and applied it to atmospheric flow in complex terrain.
- Developed rotor optimization model for wind turbine rotors.
- Implemented the Stochastic Backscatter Turbulence Model in the Colorado State University meso-scale model RAMS. Large Eddy Simulation of atmospheric boundary layer.
- Developed Measure-Correlate-Predict (MCP) methods and software for analysis of time-series, and applied it to analysis of wind data.
- Installed met. towers, evaluated wind climates in complex terrain and sited wind turbines.
- Responsible for renewable section budgets, resources and projects.

### **July 1985 – November 1986: Researcher (Compulsory Military Service)**

Norwegian Defense Research Establishment (NDRE), P.O. Box 25, 2027 Kjeller, Norway

- Developed and coded Stochastic System Engineering models.
- Participated in evaluation of defense systems.

## **JOURNAL PAPERS**

Lim, J. W., Nygaard, T. A., Strawn, R. and Potsdam, M. (2007). *Blade-Vortex Interaction Airloads Prediction Using Coupled Computational Fluid and Structural Dynamics*. Journal of the American Helicopter Society, Vol. 52, No 4, October, 2007

Nygaard, T.A. and Meakin, R. L. (2005). *Aerodynamic Analysis of a Spinning Missile with Dithering Canards*. Journal of Spacecraft and Rockets., 2005.

Pielke, R.A., Nichols, M.E., Nygaard, T.A, Walko, R.L. and Zeng, X. (1997). *Several Unresolved Issues in Numerical Modelling of Geophysical Flows*. Numerical Methods in Atmospheric and Oceanic Modelling, The Andre J. Robert Memorial Volume, C.A. Lin, R. Laprise, and H. Ritchie, Eds., 557-581, 1997.

Alm, L.K. and Nygaard, T.A. (1993). *Flow over complex terrain estimated by a general-purpose Navier-Stokes Solver*. Modeling, Identification and Control, 1995, vol. 16, No.3, 169-176.

Nygaard, T.A. (1992). *Estimating expected energy capture at potential wind turbine sites in Norway*. Journal of Wind Engineering and Industrial Aerodynamics, Vol. 39/92.

## **SELECTED CONFERENCE PAPERS**

Nygaard, T. A., Myhr, A. and Maus, K. J. *A comparison of two conceptual designs for floating wind turbines*. European Offshore Wind Conference & Exhibition, September 2009, Stockholm, Sweden.

Myhr, A., Moss, D. W. and Nygaard, T. A. *Large scale assembly and erection of floating offshore wind turbines*. European Offshore Wind Conference & Exhibition, September 2009, Stockholm, Sweden.

Lim, J., Potsdam, M., Strawn, R., Sim, B., and Nygaard, T. (2006). *Blade-Vortex Interaction Prediction Using Multidisciplinary Coupling*, High Performance Computing User's Group Conference, Denver, CO, June 2006.

Nygaard, T.A, Saberi, H., Ormiston, R., Strawn, R. and Potsdam, M. (2006). *CFD and CSD Coupling Algorithms and Fluid Structure Interface for Rotorcraft Aeromechanics in Steady and Transient Flight Conditions*. 62nd American Helicopter Society (AHS) Annual Forum and Technology Display, May 2006, Phoenix, Arizona.

Lim, J. W, Nygaard, T.A, Strawn, R. and Potsdam, M. (2006). *BVI Airloads Prediction Using Loose CSD/CFD Coupling*. American Helicopter Society Specialists' Conference on Vertical Lift Aircraft Design, January 2006, San Francisco, California.

Nygaard, T. A., Dimanlig, A. C. and Meadowcroft, E. T. (2004). *Application of a Momentum Source Model to the RAH-66 Comanche FANTAIL*. American Helicopter Society 4<sup>th</sup> Decennial Specialist's Conference on Aeromechanics, January 2004, San Francisco, California.

Hertel, N. J., Nygaard, T. A. and Duque, E. P (2004). *Passive Pitch Control of Small Horizontal Axis Wind Turbines*. ASME Wind Energy Conference, January 2004, Reno, Nevada.

Nygaard, T.A (2003). *Aeromechanic Analysis of A Missile with Freely Spinning Tailfins*. AIAA paper 2004-1369. AIAA Applied Aerodynamics Conference, June 2003, Orlando, Florida.

Nygaard, T.A. (2000). *Status and Prospects for Windpower in Norway*. Windpower 2000 Conference, May 2000, Palm Springs, California.

Nygaard, T.A.(1999). *Three-Dimensional Euler Flow-Field Computations Through a Wind Turbine Rotor*. Proceedings from European Wind Energy Conference & Exhibition (EUWEC' 99), Nice, France.

Nygaard, T.A. and Tallhaug, L. (1997). *Initial Design of a Stall Controlled Wind Turbine Rotor*. Proceedings from European Wind Energy Conference & Exhibition (EWEC' 97), Dublin, Ireland.

Alm, L.K. and Nygaard, T.A.(1993). *Flow over complex terrain estimated by a general-purpose Navier-Stokes Solver*. Proceedings from European Community Wind Energy Conference 1993, H.S. Stephens and Ass. Bedford, UK.

Nygaard, T.A. (1993) *Estimating expected energy capture at potential wind turbine sites in Norway*. European Wind Energy Conference, Amsterdam 1991.

## **REPORTS**

A list with 40 report titles (IFE) is available upon request. A selection is listed in a longer version of this CV, available on request.

## **STUDENTS UNDER PRESENT AND PREVIOUS SUPERVISION**

A list of titles for 9 senior theses, 12 master theses and 2 PhD theses is available in a longer version of this CV, available on request.