Curriculum Vitae of Niclas Björsell

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Present Position

2008 -	Associate professor (Swedish: Universitetslektor) *Absence 10% Jan 10 – Mar 12*	University of Gävle

Previous Employments

2012 - 15	Guest Professor 5% Faculty: IR (ELEC)	Vrije Universiteit Brussel
2010 - 12	Associate professor 10 % (Swedish: Universitetslektor) School of Information and Communication Technology	Royal Institute of Technology (KTH)
1991 - 08	Lecturer (Swedish: Universitetsadjunkt) *Absence Sep 98 – Mar 02*	University of Gävle
1999 - 02	Project Manager	Utilator AB
1998 - 99	Responsible for Sales, Support, and Training	Bris Data AB
1990 - 91	Automation Constructor	NLK-CelPap AB
1987 - 90	Teacher in Electronics and Automatic Control	Polhemsskolan
1986 - 87	Programming and Commissioning Control Systems	Billman-Regulator AB

Niclas Björsell

University Education

2007	Doctor of Philosophy (Telecommunication), Title: *Modeling Analog to Digital Converters at Radio Frequency* Supervisor: *P. Händel*	Royal Institute of Technology
1998	Licentiate of Science (Automatic Control), Title: *Control of heating systems in buildings* Supervisor: *T. Söderström*	Uppsala University
1994	B.Sc. in Electrical Engineering,	Uppsala University

Docent and Guest Professor

2012 - 15	Guest Professor	Vrije Universiteit Brussel
2012	Docent in Telecommunication	Royal Institute of Technology

Scientific Achievements

Brief Account of Own Research Profile

Control Strategies for HVAC Systems

The interest in research began after one year working with commissioning control systems for heating, ventilating and air-conditioning (HVAC) systems. On my initiative a joint research project with the company TAC and funded by NUTEK "Control strategies for heating systems in buildings" started. In summary, auto-tuning for two different control functions were studied, (i) feed forward compensation with correlated disturbances [IC44] and (ii) optimal preheating time [IC43]. This led, together with related results [NC13], [IC45] to a licentiate thesis [TH2] in 1998.

In parallel with the first project, a participation in the project "Demand controlled ventilation" led to two publications [IC46], [RE5]. Moreover, in both projects a simulation program under development, IDA, was used [IC42].

After the licentiate degree, a career in the industry followed; initially focused on research and development in how new technology could be used in an energy efficient way [RE4]. That career last for four years, whereupon I started over on PhD studies in a different topic.

Analog to Digital Converter Modelling and Post-Correction

Error modelling has played a main role in generating a correction of the analog to digital converter (ADC) behaviour in order to compensate for imperfections in the ADC. An online correction obtained by subtracting the modelled dynamic error to each output sample of the actual ADC. For an ideal ADC the output is a discrete time and discrete amplitude representation of the analogy input signal with fixed time and amplitude steps. The output from a practical ADC has deviations from the ideal steps. An ADC-model contains information on the size of the amplitude deviation as a function of the output code, which can be used to correct the output, and, thus, give a better representation of the analogy input. In model based post-correction, the post-correction term is computed from a mathematical model.

Modelling ADCs at radio frequency were the topic for my PhD Thesis [TH1], where model structures suited to describe a nonlinear dynamic behaviour were required. Moreover, the model has to be valid over a wide frequency range. The challenge is to find a model structure that is fairly easy to characterize with a minimum number of model parameters without any loss of information. Initially Volterra models were studied [J22], [IC37]. Based on these results a suitable ADC model for post-correction of ADCs were developed [IC35], [IC36] and evaluated [J24], [IC34].

In addition, the method for parameter estimation should be easy to use and the estimator should be efficient. The most common method using histogram test with different stimulus has been studied in [J23], [J25], [IC39], [IC40], [IC41]. Besides that, some summarizing papers have been presented at national conferences [NC12], [NC11]. Moreover, an alternative model structure has been studied, but not yet implemented for post-correction. That is the Kautz-Volterra model [J20], [IC32].

The research activities within ADC modelling and post-correction has continued after I finished my PhD, mainly together with the PhD student Samer Medawar for which I have been a supervisor. The ADC model in [IC36] has been further developed and evaluated in papers [J9], [J18], [J19], [IC20], [IC21], [IC23], [IC30], [IC33], but also with another research group [IC25]. In parallel, I have been involved in developing standards for testing ADC [ST1] and DAC [ST2].

Measurement Systems

In order to test the ADC we build our own test-bed [IC38]. Moreover, we have developed a test-bed for multivariable measurement of a power amplifier (PA) with presentation in three dimensions [IC28]. To a great extent our test-beds are based on state-of-the-art instruments to generate and acquire signals, most of the data processing is done in software. That is the idea behind synthetic instruments [NC9] although typical synthetic instrument test-beds are based general purpose front-ends. One example of data processing is to correct for non-stationary effects in measured data [J11]

A close related method to post-correction is to use digital pre-distortion (DPD) to compensate for nonlinear dynamic behaviour in PAs. This method has been implanted in signal generators in order to improve their performance [J21], [IC17], [IC19], [IC31], [NC10].

A proper choice of modulation technique in wireless systems can be utilized to reduce energy and interference. In [J17], [IC22], convex optimization was applied to peak-to-average power (PAR) reduction on an orthogonal frequency division multiplexing (OFDM) with constrains on minimized interference. The method is further developed to also include DPD in [J10], [J13], [IC15], and [NC6]. An alternative method to reduce PAPR based on channel coding is presented in [IC1].

In order to measure and characterize non-linear dynamic RF devices, new equipment has been launched on the market. Comparative studies can be found in [J8] and [NC7]. A test system based on stand-alone instruments and synthetic instruments, where the functionality for non-linear measurements lies in the software, has been developed. It is based on Zhu's generalized sampling theorem (ZGST) which states that the output signal of a nonlinear system can be reconstructed by sampling it at the Nyquist rate of the input signal rather than the Nyquist rate of the output signal. This setup includes a specially designed wideband down-converter and the test-bed allows a much wider analogy bandwidth than the commercially available vector signal analyzers, where the intermediate frequency (IF) bandwidth preceding the ADC sampler front-end is deliberately limited to increase the dynamic range by avoiding noise folding [IC27], [IC29], [NC8].

For measuring sparse waveforms, an under-sampled system based on harmonic sampling and compressive sampling has been developed [J12]. It is based on the use of multi-tones; by appropriately selecting frequencies in the multi-tone, all aliased tone will fold back on unique frequencies and the full spectrum can be recaptured; in addition frequency interleaving is used in order to increase the bandwidth [J14], [J16], [IC18], [IC24], [NC5].

Cognitive Radio

The need for radio spectrum for rapidly growing broadband access services is evident. Secondary use of already licensed, but inefficiently used, spectrum has been proposed as a solution to make more efficient use of frequency resources. There are different ways of sharing the spectrum, namely interweave, underlay, and overlay secondary access. In the interweave approach, a secondary user knows or detects spectral holes in space, time, or frequency and aligns its communications to lie within these spectral holes. The absence of the signal in a given band is not enough to assert its usability since adjacent band signals could still cause significant interference. Thus, there is also a need to consider interference in adjacent channels to ensure that the secondary users do not interfere with the primary users [RE1].

One of the prime issues in secondary spectrum access is to ensure that the primary services are not interrupted. In order to ensure this, three different methods can be used, namely cognition supporting pilot channel (CPC), geo-location database and sensing. With the CPC signalling method, unlicensed devices can only transmit if they receive a control signal (beacon) identifying vacant channels within the service areas. If geo-location database based spectrum opportunity detection is used, then the secondary user accesses a database to determine the free channels at any location. In spectrum sensing based methods, unlicensed secondary devices detect the presence of a signal via sensing the presence of any primary signals. A geo-location database method for radars is studied in [IC14] and [NC1].

Some existing techniques for spectrum sensing detectors are studied and further developed in [IC12], [IC26], and [NC4]. Also a new detection method based on discriminant analysis is developed and refined in [J1], [J7], [IC8], [IC10] and [IC11]. The method can also be used to detect impulsive noise [IC1]. In addition, the sensing time and periodic sensing interval needs to be optimized in order to maximize the through-put in the communication and/or to reduce the energy consumption. In [IC13] and [TB1], a new approach of optimizing these parameters was explored.

Secondary users operating in a frequency band it is not only interested in finding the white spaces, but it is also useful to identify the modulation technique in order to optimize minimize the

interference and maximize through put. In [J15] and [IC16], an automatic digital modulation classifier with actual RF signals was presented.

How cognitive radio can be used in a wider perspective has presented in [IC9], [RE1], [RE2].

Brief account of planned research effort

The planned research aims to explore fundamental problems within radio frequency measurement technologies with a focus on characterization of non-linear parameters and corresponding correction methods. The topic will be investigated from different angles where each approach will be studied in a work package (WP) or subprojects. In WP1, existing non-linear measurement techniques will be explored. An emerging technology for wideband measurements of sparse signals is compressed sensing; in WP2, compressed sensing will be studied; in particular its sensitivity to imperfections in the measurement system. Problems with imperfections in measurement systems due to dynamic nonlinear systems can be conquered by using post-correction, which will be the topic in WP3. The interference in co-existing communication systems and how DSA and modulation techniques can be used to minimize the affect will be addressed in WP4. The research group has a unique niche in measurement technology at high frequencies. The planned research will further develop this niche and the results to be evaluated by measurements.

WP1: Measuring and Modeling Technology for Improving RF System Performance

There is a battle between different nonlinear characterization methods within the high-frequency measurement world today. Pushed by the modelling world, which clearly needs good nonlinear measurements to obtain good nonlinear models, some nonlinear measurement instruments were developed. Three different approaches to design a measurement instrument that is able to measure the nonlinear time domain waveforms correctly can be followed: (i) a sampler-based methodology such as the large-signal network analyzer (LSNA), (ii) a mixer-based methodology e.g. nonlinear vector network analyzer (NVNA), or (iii) a sampling oscilloscope based methodology like Mesuro MB 20. The method used is the polyharmonic distortion modelling (PHD). The PHD model is identified from the responses of a DUT stimulated by a set of harmonically related discrete tones, where the fundamental tone is dominant and the harmonically related tones are relatively small. As such, it is typically applied for modelling e.g. microwave amplifiers with narrowband input signals.

Due to the high linearity and efficiency requirements on components in wireless communication systems, it is of highest importance to be able to characterize the dynamic nonlinear behaviour. In this subproject, existing techniques are evaluated to meet contemporary and future demands. Since the variety of these nonlinear measurement instruments is becoming very large, it is important to guide the user in his choice of the most appropriate nonlinear measurement technique for the considered application. The outcome of the planned measurement campaign will be a useful tool in order to compare and evaluate methods developed in the proposed project. Moreover, the noise behaviour of a nonlinear system will be studied. A nonlinear device will treat input noise in a completely different way compared to a linear device. Hence, adapted signal analysis and modelling techniques are required.

WP2: Compressed Sensing

A main problem in measuring wideband signals in the order of several GHz is the limitation on the sampling rate as well as the analogy bandwidth of ADC. For repetitive signals, an expensive state-of-art wideband sampler is usually used in front of the digitizer to downconvert the RF signal to the available analogy input bandwidth of the ADC, then sampling theory based on aliasing is used to digitize and reconstruct the wideband signal. Compressed sensing is a emerging signal acquisition technique. In contrast to traditional sampling methods, significantly fewer samples are required whenever the signals admit a sparse representation.

The method allows reconstructing a wideband signal, of size N, from a defined under-sampled data of size L, where $L < N$ under the condition that the spectrum of the measure signal has a high sparsely level, i.e. the number of spectral bins, K, with power above noise floor is much smaller than the total spectral bins, N; that is $K << N$. Another condition is that the measured samples should represent a random combination of the original data.

Compressed sensing is a technique for finding sparse solutions to underdetermined linear systems. Consider $\mathbf{X_f}$ as the sparse spectrum of the signal $\mathbf{X}$, $\mathbf{\Psi}$ is the sparsity matrix and $\mathbf{\Phi}$ the sampling matrix, the vector of the measured compressed data $\mathbf{Y}$ is written as

$$\mathbf{Y} = \mathbf{\Phi\Psi X_f} \tag{1}$$

Hence it is possible to reconstruct the original signal based on solving underdetermined set of equations. To achieve a good reconstruction the sampling matrix $\mathbf{\Phi}$ should be orthonormal and incoherent with $\mathbf{\Psi}$**;** using random distribution satisfies the conditions. The theory require a low sparsity level in the order of 10-15%, otherwise the required number of measurements increase to *N*, and hence a determined system is formed that can be solved through a least square solution. Even though the research field is a hot topic, only a few papers have focused on implementations. The open issues are related on how to measure a wideband signal with a limited analogy bandwidth ADC. In other words how to implement the $\mathbf{\Phi}$ matrix in a real system. One may consider three issues, (i) how will the performance be affected by limitations in the implantation, (ii) how can these limitations be circumvented, and (iii) design and build a test-bed.

WP3: ADC Modelling and Post-Correction

There are a large number of available model structures for dynamic nonlinear systems, such as ADCs. For example a Volterra model, which can describe any weak nonlinear system with fading memory, can be used. A well known drawback with Volterra models is that the number of coefficients grows rapidly with increase complexity. In order to reduce the number of coefficients caused by high model order and memory length the Kautz-Volterra model can be used. In [J20], a Kautz-Volterra ADC model were characterized but has not yet been applied for post-correction; that would be interesting to develop in a future work.

Most post-correction algorithms today are developed for input frequencies below half the sampling rate; that is, within the first Nyquist band. Recently we have started to characterize ADCs in higher Nyquist-bands. By that, a post correction method for under sampled ADC can be developed.

WP4: Interference Control Based on DSA and Modulation Techniques

As the use of wireless communication systems equipped with computing capacity increases new opportunities are given in the form of self-configurable wireless networks of sensors and more efficient use of spectrum as well as energy. However, it also implies challenges to achieve reliable communication in environments with co-existing communications systems and electromagnetic interference from industrial equipment. The rapid expansion of communicating sensor is partly due in part to cheaper circuits, but also due to an increased need for measurements in various areas. The industries for example, have a grooving demand of energy-efficient production and to minimize the use of hazardous substances in order to reduce environmentally harmful emissions. The requirement for energy efficient solutions also applies to the radio systems themselves.

The classifier developed in [J15] could be a useful instrument to be used in the next generation communication systems based on a flexible and DSA in order to reduce requirements for linearity and dynamic range in the radio front-end, and reduce the intermodulation induced noise floor.

Moreover, recently published results demonstrates that the use of DSA can significantly reduce requirements for linearity and dynamic range in the radio front-end, and reduce the intermodulation induced noise floor through integration of DSA with the selection of front-end filter settings.

Spectrum sensing techniques in a broad frequency range is a potential topic for future research. By that, we can combine the knowledge we have from wide-band measurement systems with the knowledge gained from the cognitive radio project.

List of publications

Journals

[J1] M. Hamid, N. Björsell, and B. Slimane, “Empirical Statistical Model for LTE Downlink Channel Occupancy”, Wireless Personal Communications, accepted, 2017.

[J2] M. Hamid, N. Björsell, and B. Slimane, “Radio Resource Allocation for Indoor Secondary Access in TV White Space”, International Journal On Advances in Telecommunications, vol 9, no 1&2, pp. 25-34, 2016.

[J3] M. Hamid, N. Björsell, and B. Slimane, “Spectrum Sensing Challenges: Blind Sensing and Sensing Optimization”, IEEE Instrumentation & Measurement Magazine, Vol. 19, 44-52 s. 2016

[J4] M. Hamid, N. Björsell, and B. Slimane, "Energy and Eigenvalue-Based Combined Fully-Blind Self-Adapted Spectrum Sensing Algorithm," Vehicular Technology, IEEE Transactions on, vol. PP, pp. 630-642, 2015.

[J5] M. Hamid, N. Björsell, and S. B. Slimane, "Signal Bandwidth Impact on Maximum-Minimum Eigenvalue Detection," Communications Letters, IEEE, vol. 19, pp. 395-398, 2015.

[J6] S. Medawar, P. Händel, B. Murmann, N. Björsell, M. Jansson,” Static Integral Nonlinearity Modeling and Calibration of Measured and Synthetic Pipeline Analog-Digital Converters”, IEEE Transactions on Instrumentation and Measurement, pp 502-511, 2014.

[J7] M. Hamid, N. Björsell, W. Van Moer, K. Barbe, B. Slimane “Blind Spectrum Sensing for Cognitive Radios Using Discriminant Analysis: A Novel Approach”, IEEE Transactions on Instrumentation and Measurement, pp 2912-2921, 2013.

[J8] L. Gonzales, K. Barbe, W. Van Moer, N. Björsell, “Cognitive Radios: Discriminant Analysis for Automatic Signal Detection in Measured Power Spectra”, IEEE Transactions on Instrumentation and Measurement, pp. 3351-3360, 2013.

[J9] C. Nader, W. Van Moer, N. Björsell, P. Händel, "Wideband Radio Frequency Measurements: From Instrumentation to Sampling Theory," Microwave Magazine, IEEE, vol. 14, pp. 85-98, 2013.

[J10] S. Medawar, P. Händel, B. Murmann, N. Björsell, M. Jansson, ”Dynamic Calibration of Undersampled Pipelined ADCs by Frequency Domain Filtering”, IEEE Transactions on Instrumentation and Measurement, pp 1882-1891, 2013.

[J11] C. Nader, P.N. Landin, W. Van Moer, N. Björsell, P. Händel, D. Rönnow, “Peak-power Controlling Techniques for Enhancing Digital Pre-distortion of RF Power Amplifiers” Transactions on Microwave Theory and Techniques, Vol. 60, Issue 11, p 3571-3581, 2012.

[J12] K. Barbe, W. Van Moer , L. Lauwers , N. Björsell, “A simple non-parametric pre-processing technique to correct for non-stationary effects in measured data” Instrumentation and Measurement, IEEE Transactions on, Vol. 61 No. 8, pp. 2085-2094, 2012.

[J13] C. Nader, W. Van Moer, N. Björsell, K. Barbe, and P. Händel, “Reducing the Analog and Digital Bandwidth Requirements of RF Receivers for Measuring Periodic Sparse Waveforms”, Instrumentation and Measurement, IEEE Transactions on, Issue 61, p. 2960-2971, 2012.

[J14] C. Nader, P.N. Landin, W. Van Moer, N. Björsell, P. Händel, "Performance evaluation of peak-to-average power ratio reduction and digital pre-distortion for OFDM based systems," Transactions on Microwave Theory and Techniques, p. 3504-3511, 2011.

[J15] C. Nader, W. Van Moer, K. Barbe, N. Björsell, and P. Händel, “Harmonic Sampling and Reconstruction of Wideband Undersampled Waveforms: Breaking the Code,” IEEE Transactions on Microwave Theory and Techniques, vol. 59, no. 11, pp. 2961-2969, November 2011.

[J16] N. Björsell, L. De Vito and S. Rapuano, "A waveform digitizer-based automatic modulation classifier for a flexible spectrum management," Measurement, vol. 44, pp. 1007-1017, Jul 2011.

[J17] C. Nader, N. Björsell, and P. Händel, "Unfolding the frequency spectrum for undersampled wideband data," Signal Processing, vol. 91, pp. 1347-1350, 2011.

[J18] C. Nader, P. Händel, and N. Björsell, "Peak-to-Average Power Reduction of OFDM Signals by Convex Optimization: Experimental Validation and Performance Optimization," Instrumentation and Measurement, IEEE Transactions on, vol. 60, pp. 473-479, 2011.

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International Conferences

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[IC2] R. Krishnan, N. Björsell and C. Smith, “SHAPE Algorithm for Approximate Computation of Angular Velocities in Humeral Motion”, in Instrumentation and Measurement Technology Conference (I2MTC) Proceedings, 2017 IEEE International, accepted.

[IC3] S. R. Panigrahi, N. Björsell, and M. Bengtsson, “Feasibility of Large Antenna Arrays towards Low Latency Ultra Reliable Communication”, IEEE ICIT 2017

[IC4] R. Krishnan, N. Björsell and C. Smith, “Invariant Spatial Parametrization of Human Thoracohumeral Kinematics: A Feasibility Study”, IROS 2016

[IC5] D. Andersson et.al,” Radar Images of Leaks in Building Elements”, 6th International Building Physics Conference, IBPC 2015.Vol 78, pp. 1726-1731.

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[IC10] M. Hamid, J. Ferrer Coll, N. Björsell, J. Chilo, W. Van Moer, “Multi-Interference Detection Algorithm using Discriminant Analysis in Industrial Environments”, IEEE Industrial Electronics Society (IECON 2013), pp. 5600-5604, 2013

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[IC16] M. Hamid, N. Björsell, “Maximum Minimum Eigenvalues Based Spectrum Scanner for Cognitive Radios”, the International Instrumentation and Measurement Conference (I2MTC), pp. 2248-2251 2012.

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[IC38] N. Björsell and P. Händel, "Post-Correction of Under-Sampled Analog to Digital Converters," in IMTC 2007 – Instrumentation and Measurement Technology Conference Warsaw, Poland, 2007.

[IC39] P. Händel, N. Björsell, and M. Jansson, "Model Based Dynamic Characterization Of Analog-Digital-Converters At Radio Frequency — Invited paper," in ISSPA Sharjah, 2007.

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[IC41] N. Björsell, D. Rönnow, P. Händel, "Measuring Volterra kernels of analog to digital converters using a stepped three-tone scan," proc. IMTC 2006 pp 1047-1050, Sorrento, Italy, 2006.

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[IC45] N. Björsell and P. Händel, "Benefits with Truncated Gaussian Noise in ADC Histogram Tests" Proceedings of IMEKO 04. Vol 2. pp. 787-792. Athens 2004.

[IC46] N. Björsell, et.al., "IDA Indoor Climat and Energy" Proceedings of Building Simulation '99. Vol. 2, pp. 1035-1042. Kyoto 1999.

[IC47] N. Björsell, "On control strategies for heating systems: A model based estimate of optimal preheat time" Proceedings of EPIC '98. vol. 2, pp. 618-623. Lyon 1998.

[IC48] N. Björsell, "An automatically tuned feedforward compensation for heating systems with correlated disturbances" Proceedings of IASTED Control and Applications'98. pp. 204-208. Honolulu 1998.

[IC49] N. Björsell, "Control strategies for heating systems" Proceedings of Building Simulation '97. vol. 1, pp. 295-300. Prague 1997.

[IC50] N. Björsell, "Control strategies for demand controlled ventilating systems" Proceedings of roomvent '96. vol. 1, pp. 273-278. Yokohama 1996.

National Conferences

[NC1] S. R. Panigrahi, N. Björsell, and M. Bengtsson,"Large Antenna Array for Low Latency and Ultra Reliable Communication" in Swe-CTW 2017, Göteborg, 2017.

[NC2] R. Krishnan, N. Björsell and C. Smith, "How do we plan movements?:A geometric answer", DEMOVE symposium, Baiona, Spain, 2016

[NC3] R. Krishnan, N. Björsell and C. Smith, "Human shoulder functional kinematics: Are we ready for the high-reliability computational challenge?", Workshop on Human Movement Understanding and Robotics, IEEE/ RSJ IROS 2016, Daejeon, Korea.

[NC4] R. Krishnan, N. Björsell and C. Smith,, "Moving towards cognitive understanding of human shoulder kinematics", International Symposium on the Neuromechanics of Human Movement, Heidelberg, Germany. 2016

[NC5] D. Rönnow et.al. "Radio Measurement Technology for Characterization of Nonlinear Devices and Industrial Radio Environments", in Proceedings GigaHertz 2014, accepted, 2014

[NC6] M. Hamid, N. Björsell, W. Van Moer, K. Barbé and B. Slimane, " Blind Spectrum Sensing for Cognitive Radios Using Discriminant Analysis: A Novel Approach," in Swe-CTW 2013, Göteborg, 2013.

[NC7] M. Hamid and N. Björsell, " Power Assignment for Secondary Users Operating in TVWS Geo-locations Database Based Cognitive Radios," in Swe-CTW 2012, Lund, 2012.

[NC8] M. Hamid and N. Björsell, "Maximum Minimum Eigen Values Based Spectrum Scanner in GNU Radio," in RF Measurement Technology Conference Gävle, 2011.

[NC9] C. Nader, W. Van Moer, K. Barbé, N. Björsell and P. Händel, " Evolved Harmonic Sampling: a Tool to Reduce the Digital Bandwidth Requirement of RF Receivers," in RF Measurement Technology Conference Gävle, 2011.

[NC10] P. Landin et. al., “Overview of Synergetic OFDM Crest Factor Reduction and DigitalPre-Distortion for RF Pas” in RF Measurement Technology Conference Gävle, 2011.

[NC11] K. Voet, W. Van Moer, N. Björsell, and P. Händel, "Nonlinear Measurement Instruments – A Comparative Study" in RF Measurement Technology Conference Gävle, 2011.

[NC12] C. Nader, P. N. Landin, N. Björsell, M. Isaksson, D. Wisell, P. Händel, O. Andersen, and N. Keskitalo, "Wideband Power Amplifiers Characterization by Undersampling: Zhu-Frank Sampling Theorem," in RF Measurement Technology Conference Gävle, 2009.

[NC13] M. Siddiq and N. Björsell, "Synthetic Instruments – an overview," in Nordic Test Forum 2008 Tallin, Estonia, 2008.

[NC14] C. Luque and N. Björsell, "Model-based Pre-distortion for Signal Generators," in Proceedings GigaHertz 2008, Göteborg, Sweden, 2008, pp. 88.

[NC15] P. Händel, N. Björsell, M. Jansson, and S. Medawar, "Modeling of the Dynamics of Analog-Digital-Converters at Radio Frequency," in RF Measurement Technology Conference Gävle, 2007.

[NC16] N. Björsell and P. Händel. ”Analog-to-Digital Converters for High-Speed Applications” Proceedings of. GigaHz 2005, pp. 151-154. Uppsala 2005.

[NC17] N. Björsell, "Reglerstrategier för uppvärmning av bostäder" Proceedings of Reglermöte ‘96, pp. 174-175. Luleå 1996.

[NC18] N. Björsell, "Matlab in cooperation with data acquisition software" Proceedings of Nordic Matlab Conference, pp. II-29 - II-31. Stockholm 1995.

Thesis

[TH1] N. Björsell, "Modeling Analog to Digital Converters at Radio Frequency" Doctoral thesis, Stockholm 2007.

[TH2] N. Björsell, "Control of heating systems in buildings" Licentiat thesis. UPTEC 98 002R, Uppsala 1998.

Text Books

[TB1] N. Björsell, "AD and DA conversion," in Modern Measurements: Fundamentals and Applications, A. Ferrero, D. Petri, P. Carbone, and M. Catelani, Eds., ed: Wiley-IEEE Press, 2015, pp. 125 - 148.

[TB2] M. Hamid, N. Björsell, A. Mohammed, "Iterative Optimization of Energy Detector Sensing Time and Periodic Sensing Interval in Cognitive Radio Networks," in Self-Organization and Green Applications in Cognitive Radio Networks, ed: IGI Global, 2013, pp. 53-69.

[TB3] B-O Lundinger, "IT för tekniker och ingenjörer", Part of Chapter 3, Utbildningsradion, Stockholm 1997.

Standards

[ST1] IEEE, "IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters”, in IEEE Std 1241-2010 (Revision of IEEE Std 1241-2000), ed, 2010, pp. 1-139.

[ST2] IEEE, "IEEE Standard for Terminology and Test Methods for Digital-to-Analog Converters," in IEEE Std 1658-2011, ed, 2011, pp. 1-114.

Reports

[RE1] M. Petrova et.al., "Final Report on Models with Validation Results " EU FP7 project INFSO-ICT-248303 QUASAR, 2012.

[RE2] J. Kerttula et.al., "Laboratory Test Report" EU FP7 project INFSO-ICT-248303 QUASAR, 2012.

[RE3] N. Björsell, H. Mohamed, J. O. Kerttula, E., and M. I. Rahman, "Initial Report on the tolerance of legacy systems to transmissions of secondary users based on legacy specifications" EU FP7 project INFSO-ICT-248303 QUASAR, 2010.

[RE4] U. Norlen, and N. Björsell, "Electronic energy services to the home: A demonstration of the Energy Barometer system". The KEES Project - Energy Efficiency in a Deregulated Market, Chap. 6. Enersearch, Malmö 1999.

[RE5] N. Björsell N and C. Blomqvist, "Utveckling av nya system som ger möjlighet till flexibel behovsstyrning av luftflöden". University of Gävle FoU-rapport Nr 40, Gävle 1998.

Approved Grants

Funding from EU, Trusts or other Sources

2010 - 12 EU FP7 project “QUASAR”
Role: Task leader

Main project leader: KTH (SE)
Other co-leaders: Ericsson AB (SE), RWTH Aachen University (DE), Aalto University (FI), Yonsei University (Rep. of Korea), BT PLC (UK), BNetzA (DE), Ss Cyril & Methodius University (Macedonia), PTS (SE), Ofcom (UK), FICORA (FI)

ID: INFSO-ICT-248303

Funding from Trade and Industry and Public Authorities

2007 - 09 KKS project “Radio Frequency Measurement Technology for Future Power Amplifiers and Transmitters”
Role: Co-applicant

Main project leader: Niclas Keskitalo, HiG/Ericsson AB
ID: 2006/0231, KKS supported the project with 4943 kSEK

2006 Vinnova project “Samverkansutvärdering HiG”
Role: Applicant
ID: 2006-00702, Vinnova supported the project with 200 kSEK

2004 - 06 KKS project “Novel Measurement and Modelling Techniques for RF Power Amplifiers”, 3.607.000 SEK
Role: Co-applicant

Main project leader: Niclas Keskitalo, HiG/Ericsson AB
ID: 2003/0218, KKS supported the project with 3607 kSEK

Other Scientific Achievements

Active Participation in National and International Conferences

2016 GlobeCom 2016
Member of the technical program committee

2015 CrownCom 2015
Member of the technical program committee

2015 IEEE I^2MTC 2015
Associate technical program committee chair

2014 GlobeCom 2014
Member of the technical program committee

2014 IEEE I^2MTC 2014
Member of the technical program committee

2013 GlobeCom 2013
Member of the technical program committee

2013 IEEE I^2MTC 2013
Member of the technical program committee

2013 IMEKO TC4 2013

Member of the technical program committee

2012 Swedish CTW 2012
Member of the technical program committee

2012 CrownCom 2012
Member of the technical program committee

2012 IEEE I^2MTC 2012
Member of the technical program committee

2011 Swedish CTW 2011
Member of the technical program committee

2011 RFMTC 11
General chair

2011 IEEE I^2MTC 2011
Member of the technical program committee and session chairman

2011 IMEKO IWADC & IEEE 2011 ADC Forum
Member of the technical program committee

2010 IMEKO IWADC 2010
Member of the technical program committee and session chairman

2009 IMEKO World Congress
Member of the technical program committee

2009 RFMTC 09
Member of the organizing committee

2007 IEEE I^2MTC 2007
Session chairman

2007 RFMTC 07
General chair

2005 Swedish ADDA 05
General chair

National and International Awards

2011 IEEE The instrumentation and measurement society “Outstanding reviewers of 2011”
IEEE transaction on instrumentation and measurement

2009 IEEE The instrumentation and measurement society “Outstanding reviewers of 2009”
IEEE transaction on instrumentation and measurement

Editorial or Advisory Assignments in International Periodicals

2012 - IEEE Transactions on Instrumentation & Measurement
Associate Editor

Review / Referee Assignments

2015 Faculty opponent for C. Kabiri, “On the Performance of Underlay Cognitive Radio Networks with Interference Constraints and Relaying” Dept. of Communication systems, Blekinge Institute of Technology

2015 PhD Grading committee for A. K. M. Pillai, “Signal Reconstruction Algorithms for Time-Interleaved ADCs” Dept. of Electrical engineering, Linköping University.

2012 PhD Grading committee for A. S. Tehrani, “Behaviour modeling of wireless transmitters for distortion mitigation” Dept. of Signals and Systems, Chalmers

2005 - IEEE Transactions on Instrumentation & Measurement
2005: 3, 2006: 1, 2007: 3, 2008: 4, 2009: 5, 2010: 2, 2011: 5, 2012: 2

2006 - Measurement
2006: 1, 2007: 0, 2008: 0, 2009: 1, 2010: 0, 2011: 1, 2013: 1

2009 -	Electronics letter 2009: 1, 2010: 2, 2011: 2, 2012: 4
2010 -	Circuits, Systems & Signal Processing 2010: 1

Assignments as Outside Expert

2010 - 13	External expert in the Tempus project Creation of the Third Cycle Studies-Doctoral Studies in Metrology, 58599-tempus-mk-tempus-jpcr

Scientific Qualifications of a Non-academic Nature

1999 - 02 IT-baserade omvårdnadstjänster i hemmet
Role: Project Manager and R&D coordinator

The objective was to find an appropriate IT-standard for ordinary apartments so that they easily can be adapted to home care services and thereby make it possible for people with these needs to stay at the apartments. The project was managed by JM AB in collaboration with Utilator AB and Interactive Institute and in cooperation with Danderyd Hospital, The Knowledge Foundation (KK-stiftelsen) and The Vårdal Foundation. Founded by KKS 1999/0421, 700.000 SEK

2001 - 02 Fotosvararen
Role: Deputy Project Manager

This was a product developing project in cooperation with the research institute Interactive Institute, Frontyard AB and, The Knowledge Foundation (KK-stiftelsen). "Fotosvararen" (eng. The Photo messenger), which was the working title, facilitates the handling of incoming telephone massages using photos. It helps people with concentration and memory problems. This is now commercialized by Polycom AB. The project was founded by KKS 2001/0118, 300.000 SEK

1999 KEES
Role: Project Manager
This was a sub-project in a larger research project managed by EnerSearch AB. The objective was to study in which way the fast growing information technology would make energy distribution more efficient and at the same time create synergism with the growing information society by offering the electrical grid as a communication channel.

PEDAGOGICAL ACHIEVEMENTS

Account of own Pedagogical Experience

I started as substitute teacher in upper secondary school, Polhemsskolan, in Gävle during 1987 - 90. The courses I thought was: Elektronik åk 3, Elektronik åk 4, Specialarbete maskin åk 4, Reglerteknik maskin åk 4, and Reglerteknik VVS åk 4. At this time the engineering education was slowly moving from upper secondary school (gymnasieingenjör) to bachelor programs at universities (högskoleingenjör). During my last year, 1990, I was teaching in the course Reglerteknik VVS at the University of Gävle.

I am with University of Gävle since 1991, initially as substitute lecturer and teaching assistant. I have continuously developed my skill by both pedagogical training as subject knowledge. I have read a total of four pedagogical education courses, a Licentiate degree in automatic control and a Ph.D. degree in telecommunications. My teaching experiences are in short:

- Almost 20 years of teaching experience
- Lecture in more than 20 different courses.
- Course responsible in about nine courses.
- Responsible for the development of the study program, Automationsingenjör, co-op, 180 hp.
- Developed five entire courses and developed parts of further three course.
- Developed several new assignments and laboratory exercise, where one is published [NC14].
- Lectured temporarily at Universities abroad (Peru and Italy) as well as at other universities in Sweden (KTH and LiU).
- Organizer of an European summer school 2008-2010

- International expert in creation of doctoral studies in metrology.
- Co-author of chapters in two books.
- Involved in educational development projects.
- Manager of two study programs.
- Has supervised 17 Master students an several Bachelor students
- Supervising five PhD students of which three holds a doctorate:
    - Samer Medawar (PhD 2012), co-supervisor, main supervisor: Peter Händel, KTH
    - Charles Nader (PhD 2012), *de-facto* supervisor, main supervisor: Peter Händel, KTH. Charles Nader also has (Cotutelles) PhD from Vrije Universitet Brussel (VUB). The supervisor at VUB was Wendy Van Moer
    - Mohamed Hamid (PhD 2015), *de-facto* supervisor, main supervisor: Ben Slimane, KTH
    - Rakesh Krishnan Thekkeparampumadom (PhD ~2019), main supervisor, co-supervisor: Christian Smith, KTH
    - Smruti Ranjan Panigrahi (PhD ~2020), *de-facto* supervisor, main supervisor: Mats Bengtsson, KTH

Personal Pedagogical Ideas about Undergraduate and Postgraduate Teaching

In general

The holistic perspective is a key issue trough out my teaching approach. As the head of the electronics group and as the manager for a study program I arrange regular meetings to discuss the overall structure of study programs to ensure progression and interaction between courses in order to avoid unnecessary overlap while preventing gaps and take advantage of synergy effects. As course responsible lecturer my first lecture is an overview of the course and my last is a summary; each new topic in a course is introduced in its context. Moreover, I strive to have assignments or laboratory work in the end of the course, where the students apply the theoretical topics, preferable in a holistic approach.

It is my belief that students have different ways to learn and I therefore try to show different methods to learn different topics. A mathematical derivation can sometimes also be illustrated by a graphical solution, for example. In addition, I try to provide various tools to either solve a problem of to clarify/illustrate a theoretical topic. A typical course may consist of; (i) theoretical problems to solve analytically, (ii) simulations assignments and (iii) laboratory work. Problem solving and assignments are typically individual work, while laboratory work is in groups of 2-4 persons.

My intention is to ensure that the students have easy access to all course material and tools. At the University of Gävle we use a web-based platform for that called Blackboard. Moreover, most of the computer based tools (e.g. simulation software) are available on a server, accessible also from outside the university. Assignments and laboratory work is handed in via Blackboard and automatically plagiarism will be checked. In addition, the assignments are typically design so that each student has their own data-file in order to stress individual work.

The use of Blackboard also ensures that assignments and laboratory reports are handled in a legally secure manner. It is particularly important when the courses may have multiple teachers involved. The student must feel confident that his/her work remains even if the lecturer and/or assistant leave the university.

A reflection of a more general nature is racism, sexism and nepotism. We would like to believe that there is no, but there is. There are remarkable papers published in well-reputable journals about unfair approval of research funds. There have also been racist elements among students. I try to be aware of this, take action and report.

Supervision

I have experience from 4 PhD students, 17 Master students and several Bachelor students. What they have in common is that the supervisor ought to guide them in their planning, define the project so that they can complete it successfully, hint and give suggestions on where to find

relevant literature, assist with resolving practical issues (e.g. access to computers and laboratory facilities) and assist with layout and review of reports/papers. How efforts shall be distributed depends on the individual and the level of education.

So far the University of Gävle has not been allowed to graduate PhD students in the field of Electronics. Thus, all our PhD students have been PhD students at other universities, even though they work full time at HiG. The situation for the PhD students I supervise is that they are PhD students at KTH. Consequently, the PhD students have a main supervisor at KTH and me as their *de-facto* supervisor. My pedagogical ideas in the following text will be based on the role as *de-facto* supervisor. However, the most of the ideas can be applicable for supervision of bachelor, master students, and PhD student where I am co-supervisor.

Doctoral students should early be involved in the process of writing articles. In addition, the PhD candidate might be successively involved in the process of paper reviews. Initially the student reads a paper that I will review and we discuss my comments. After a while the student and I will make separate reviews and we compare our comments. By that he/she will be aware of what is expected of a good article and, in addition, the student will be trained in critical reading.

It is clear that the role of a supervisor will depend on how far the student has come in his/her education. At the beginning of the training you have to give more support, clarify what is expected of the student and early start the process of writing scientific reports/papers. Later in the training, a supervisor should focus on that the student takes initiative on analysis and problem formulation. Finally, it is important to get the student to come to an end and assist him/her with the formalities surrounding the defence of the thesis.

All PhD students are individually different. Thus, the supervision should to be individualized by mutual agreement between the student and the supervisor. This agreement shall be settled early in the doctoral education and it must be preceded by a meeting where the parties discuss their expectations of each other's roles and discussing alternative leadership.

I believe that there is a need for regular meetings where student and supervisor jointly determine structure and periodicity. The student will take notes during the meeting and send it by e-mail to me. If I agree we have a written mutual understanding of the results from the meeting. Moreover, it can be distributed to the main supervisor at KTH in order to keep him updated since he does not typically attend to all meetings.

In addition to the regular meetings, it is appreciated by many, both mentors and graduate students to spend some time together and discuss research undisturbed. This can be done by jointly carry out measurements in the lab, sit together and write articles, or in connection with conferences taking time for discussions.

On top of the situation with one *de-facto* supervisor at HiG and a main supervisor at KTH, it can also be a third supervisor. My experience is limited to an adjunct professor from the industry and professor from a university in Europe. In order to avoid misunderstanding it is important to have regular contact and give uniform information to the PhD student, both in terms of expectations on him/her as well as conditions to complete the task.

Own Teaching Effort at Undergraduate and Postgraduate Level

University of Gävle

2012 - Measuring and Characterizing Nonlinear RF Systems 4.0 hp (Postgraduate level)
Lectures: 12 h, Students 4-8 students
2012: Developed the course in collaboration with Wendy Van Moer (VUB), lectured
2013: Lectured

2005 - Statistical signal processing, 7.5 hp (Advanced level)
Lectures: 30 h, Exercises: 12 h, Students: ≈ 25 students
2005: Developed the entire course, lectured and held exercises
2007: Lectured and held exercises
2008: Lectured and held exercises
2009: Lectured
2010: Lectured

2011: Lectured
2012: Lectured
2013: Lecture

2010 - Modulation and Coding, 7.5 hp (Advanced level)
Lectures: 28 h, Students: ≈ 25 students
2010: Lectured and developed assignments
2011: Lectured
2012: Lectured and developed laboratory work

2009 - Mätsystem, 7.5 hp (Basic level)
Lectures: 24 h, Laboratory work: 16 h, Students: ≈ 6 students
2009: Developed the entire course, lectured, held exercises and laboratory work
2010: Lectured, held exercises and laboratory work
2012: Lectured, held exercises and laboratory work
2013: Lectured, held exercises and laboratory work

2012 - Introduktion till Automation, 7.5 hp (Basic level)
Lectures: 20 h, Students: ≈ 4 students
2012: Developed the entire course, lectured, held exercises and laboratory work

2009 Electricity Engineering, 7.5 hp (Basic level)
Lectures: 12 h, Students: 11 students
Developed half of the course and lectured

2009 Measurement systems, 7.5 hp (Basic level)
Lectured 6 h for ≈ 20 students

2009 - 10 Signaler och system/Signals and systems, 15 hp (Basic level)
Lectures: 46 h, Exercises: 10 h, Students: ≈ 25 students
2009: Lectured and held exercises
2010: Lectured and held exercises

2005 – 08 Energy systems 7.5 hp (Basic level)
Lectured 4 h

1991 - Installationsteknik (Basic level)
Lecture, developed the part “styr och regler”,

1991 - 05 Courses given before 2006 (all at Basic level):

Reglerteknik, Samplade reglersystem, Industriell styrteknik, Processreglering, Styr- och reglerteknik, Digitalteknik, Elteknik, Ingenjörsdatorverktyg, Matematikkurser på ingenjörsprogram, Datakurser på ingenjörsprogram

International Universities

2012	Fifth workshop on metrology, Lectured 4 h in RF measurement technology	University of Split, Croatia
2011	Second workshop on metrology, Lectured 4 h in RF measurement technology	Cyril and Methodius University, Macedonia
2009	Procedamiento Digitale de Señales, Lectured a 3 week course in Digital signal processing	Universidad Nacional de San Augustin, Peru
2009	IEEE 2nd Annual International Measurement University, Summer school Lectured 1 day in A/D and D/A conversion	Universita' degli Studi di Trento, Italy
2007	ADC & DAC Metrology, Summer school Lectured 1 day in sampling techniques	University of Sannio, Italy

Design of Own Course Materials List These, Including their Scope

2010	Assignments	Modulation and Coding
2009	Assignments	Statistical Signal

		Processing
2009	Laboratory instructions Project assignments	Mätsystem
2008	Simulation assignment	Installationsteknik
2008	Laboratory Instructions [NC14]	Samplade Reglersystem
2007	Laboratory Instructions	Processreglering
1997	Part of Chapter 3 in the book: B-O Lundinger, "*IT för tekniker och ingenjörer*". [TB3]	Ingenjörsdatorverktyg

Own Pedagogical Education

2009	Forskarhandledning 3.0 hp	Royal Institute of Technology (KTH)
2008	Interkulturella undervisningssituationer med fokus på Kina, 7.5 hp (HEI00A)	University of Gävle
2007	Betyg och bedömning, 7.5 Hp (3IH03A)	University of Gävle
1995	Pedagogisk kurs för högskolelärare	University of Gävle

Pedagogical Development Effort

2011 - **Automation Engineering Program**

Responsible for the development and implementation of the study program.

2004 - 05 **Gävle modellen**

University of Gävle has since 2004 a project based study program for engineers. I was the manager of the electrical engineering program during this time and participated in the group that implemented the new philosophy.

2004 - 06 **Bologna process**

During the implementation of the Bologna process in Sweden the University of Gävle decided to also replace the grading system. This led to extensive work to redesign courses and write new curricula. During this time, I was head of the electronics group.

2004 **Styr framåt**

The upper secondary school, Polhemsskolan in Gävle, purchased comprehensive multi-station equipment for education within automation. I participated in the evaluation group as a representative from the university of Gävle.

Own Essays of a Popular Science Nature

2013	“Measuring and characterizing nonlinear RF systems”, tutorial at ” the International Instrumentation and Measurement Conference (I^2MTC), Minneapolis.
2012	“Software defined radio - Design and performance measure”, NI-days, Stockholm.
2009	”Effektivare mätmetoder för radiosystem - att sopa rent bland radiovågor, ljud och signaler”; University of Gävle.

Academic Supervising Experience

Master students

2013	A. Sanz, “Control algorithms for energy savings in irregularly occupied buildings”, 15 hp
2013	T. Yang, “ Sensitivity Analysis of Digital Pre-Distortion Algorithms for Amplifier Linearization - The Impacts of Jitter and Quantization”, 30 hp
2013	Q. Zhang, “Signal Classification Implemented by Wavelet Analysis and Support Vector Machine”, 30 hp

2012	T. Feng, “Noise contributions in Nonlinear Vector Network Analyzer (NVNA) measurements”, 30 hp
2012	B. Kazemi, “Developing a Low-Cost Directional Coupler”, 30 hp
2011	L. Gonzales, “Helping cognitive radios in their search for free space”, 30 hp
2010	A. Buccardo, “A Signal Detector for Cognitive Radio System”, 30 hp
2010	T. Teshome, “FPGA based Eigen value Detection Algorithm for Cognitive Radio”, 30 hp
2010	X. Wu, “Design of Passive UHF RFID Tag Antennas and Industry Application”, 30 hp
2009	S. Jawdat, “Dynamic Nonlinear Pre-Distortion of Signal Generators for Improved Dynamic Range”, 30 hp
2009	X. Wu, “The Survey of Detection Methods and Testbeds For Cognitive Radio Application”, 30 hp
2008	H. Al-Tahir, “Multidimensional Measurements: on RF Power Amplifiers”, 30 hp
2008	E. G. Condo Neira, “Multidimensional Measurements on RF Power Amplifiers”, 30 hp
2008	M. Siddiq, “Synthetic Instruments an overview” , 30 hp
2008	P. Gong, H. Guo,“Post-Correction of Analog to Digital Converters”, 30 hp
2007	C. Lugue, "Model-based pre-distortion for signal generators", 30 hp
2006	M. Mansour, “ Spectrally Pure Signal Generation Based on Spectrum Analyser Measurements Using Pre-distortion“, 30 hp
2004 - 05	Kaveh Danandeh Dodaran, “DC Specification for ADC’s with Varying Sampling Frequency”
	A. Stephan. “Modelling Analog-to-Digital Converters Using Volterra Filtering”
	E. Wali, "Truncated Gaussian Noise in ADC Histogram Tests"

Doctoral Students

2007 - 12	Samer Medawar Main supervisor: Peter Händel, EES, KTH	Lic: Feb 5, 2010 PhD: June 8, 2012
2008 - 12	Charles Nader (de facto supervisor) Main supervisor: Peter Händel, EES, KTH	Lic: Aug 20, 2010 PhD:Aug 17, 2012
2010 - 15	Mohamed Hamid (de facto supervisor) Main supervisor: Ben Slimane, ICT, KTH	Lic: Feb 7, 2013 PhD: Feb 13, 2015

Doctoral Students at Present Being Supervised

2014 -	Rakesh Krishnan Thekkeparampumadom
2015 -	Smruti Ranjan Panigrahi

Approved Grants

2012	Cooperation in the program Linnaeus-Palme Role: Principal investigator Other co-leaders: University of Zagreb. ID: IPK/2012:3949, Financial support: 244 000 SEK
2010 - 13	Tempus project “Creation of the Third Cycle Studies-Doctoral Studies in Metrology” Role: External expert and Local organizer Main project leader: Ss. Cyril & Methodius University-Skopje Other co-leaders: South-Eastern European University, University of Zagreb,

	University of Split and the University of Prishtina, University of Pavia, University of Zaragoza, Czech Technical University in Prague, Technical University Carolo Wilhemina of Braunschweig, Graz University of Technology, Bureau of Metrology of R. Macedonia.
	ID: 58599-tempus-mk-tempus-jpcr
2012	Cooperation in the program Linnaeus-Palme Role: Principal investigator
	Other co-leaders: University of Zagreb.
	ID: IPK/2011:3738, Financial support: 40 000 SEK
2010	European summer school “Distributed measurement system”. Role: Principal investigator
	Other co-leaders: The Royal Institute of Technology, Instituto Superior Tecnico,University of Sannio, Czech Technical University in Prague, Techinal University of Kosice, University of Calabria, Budapest University of Technology and Economics, Graduate School of Engineering in Electronics, Computer Science and Telecommunication of Bordeaux, Gdynia Maritime University.
	ID: 2009:1230, Financial support: 44 140 Euro
2009	European summer school “Distributed measurement system”. Role: Principal investigator
	Other co-leaders: The Royal Institute of Technology, Instituto Superior Tecnico,University of Sannio, Czech Technical University in Prague, Techinal University of Kosice, University of Calabria, Budapest University of Technology and Economics, Graduate School of Engineering in Electronics, Computer Science and Telecommunication of Bordeaux, Gdynia Maritime University.
	ID: 2008:1160, Financial support: 38 290 Euro
2008	European summer school “Distributed measurement system”. Role: Principal investigator
	Other co-leaders: The Royal Institute of Technology, Instituto Superior Tecnico,University of Sannio, Czech Technical University in Prague, Techinal University of Kosice, University of Calabria, Budapest University of Technology and Economics, Graduate School of Engineering in Electronics, Computer Science and Telecommunication of Bordeaux.
	ID: 2007:1716, Financial support: 26 869 Euro

Administration of Education

2011 -	Manager of the Automation Engineering Program (Swedish: Programansvarig)	University of Gävle
2002 - 05	Manager of the Electrical Engineering Program (Swedish: Programansvarig)	University of Gävle

OTHER ASSIGNMENTS

Administrative Assignments

2010 - 12	Head of Center for RF Measurement Technology	University of Gävle
2003 - 04	Member of the board for Research and Education for Technical and Science subjects (TN-nämnden)	University of Gävle
1995 - 98,	Member of the board for Research and Development	University of Gävle
1994 - 98	Member of the board of the Library	University of Gävle

Experience from Unit Leadership

2010 - 11	Head of division ATM/Electronics (Ämnesföreträdare) The assignment entailed no economical or personnel responsibilities.	University of Gävle
2006 - 09	Head of Electronics division (Avdelningsföreträdare) Number of employees: 15-20 Annual turnover for education: ≈ 9 MSEK. The research turnover increased from 3.1 MSEK in 2005 to 9.9 MSEK in 2009.	University of Gävle

Membership of University Boards or Councils

2010 - 13	Member of the university board	University of Gävle

Politically Associated Research Assignments

Member of an International Research Council, Programmes, Committees or Advisory Groups.

2005 -	Member of IEEE standardization groups 1241 - Standard for Analog to Digital Converters
2005 -	Member of IEEE standardization group 1658 - Standard for Digital to Analog Converters
2012 -	Secretary of IEEE standardization group P2414 - Standard for Jitter and Phase Noise

Other Work within the Third Assignment

2011	General chair at the conference Radio Frequency Measurement Technology Conference (RFMTC) 11
2007	General chair at the conference Radio Frequency Measurement Technology Conference (RFMTC) 07
2004 - 05	Organizer of the national research conference “Swedish ADDA 05”, Advanced A/D and D/A conversion

RESUME OF APPLICATION

Name
Niclas Björsell

Year of birth
1964

Man/Woman
Man

Present Position
Associate professor (Universitetslektor i elektronik) since Feb 1, 2008
University of Gävle, *Absence 10% Jan 10 – Mar 12.*

Guest Professor 5%, 2012 – 2015
Vrije Universiteit Brussel

First Academic Degree, Year and University
B.Sc. in Electrical Engineering, 1994, Uppsala University

Doctoral Degree, Year and University
Doctor of Philosophy (Telecommunication), 2007, Royal Institute of Technology

Conferment of the Title of Docent, Year and University
Docent in telecommunication, 2012, , Royal Institute of Technology

Number of Articles in Periodicals with a Referee System
20

Number of Doctoral Students Supervised
Samer Medawar (PhD 2012), Charles Nader (PhD 2012), Mohamed Hamid (PhD 2015), Thekkeparampumadom, Smruti Ranjan Panigrahi

Pedagogical Merits:
More than 20 years of teaching experience, 4 courses in own pedagogical education (including "Forskarhandledning"), supervise 5 PhD-students and 17 M.Sc., national and international experience from teaching as well as course and study program development, manager of two study programs.