

Carsten Wulff

Analog designer, programmer, educator and group manager

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Work experience		
Nordic Semiconductor	2015-now	Group Manager, Wireless Recruited 30+ people Active in Bluetooth Special Interest Group; Core Specification Working Group Analog design nRF53 Tool development (Python/C) Embedded programming (nRF52/nRF53)
	2014-2015	Team Lead Analog design nRF91 Tool development (Perl)
	2011-2014	Senior R & D Engineer Analog design nRF52 Tool development (Perl)
	2008-2011	R & D Engineer Analog design nRF51 Tool development (Perl)
NTNU	2021-now	Associate Professor TFE4188 - Advanced Integrated Circuits (2022) TFE4152 - Design of Integrated Circuits (2021) Research goal: Create a new analog design paradigm, how we design analog circuits is too slow.
	2020-2021	Guest Researcher Development of TFE4188 - Advanced Integrated Circuits
	2014-2017	Post.Doc A Compiled 9-bit 20-MS/s 3.5-fJ/conv.step SAR ADC in 28-nm FDSOI for Bluetooth Low Energy Receivers , IEEE Journal of Solid-State Circuits
	2004-2008	Ph.D. student Efficient ADCs for nano-scale CMOS technology
	2001-2003	Teaching assistant Planning and execution of transfer of the CAD system from HP-UX to Linux Development of Next Generation Lab, an online electronics lab. Linux administration
Wulff Consulting	2000-2010	Board member and consultant Consulting on .NET and C#
Interconsult group	1999-2000	Summer intern, part time Programming in Visual Basic, Active Server Pages, and PHP.
Lecture experience	2022-now	TFE4188 - Advanced Integrated Circuits
	2021	TFE4152 - Design of Integrated Circuits
	2010-now	Guest lectures at NTNU every year, some of the presentations can be found at http://www.wulff.no/presentations
	2006	TFE4200, Analog integrated circuits, responsible for frequency response, noise and CMOS modeling
Programming		I've had a love of programming since my first real summer internship back in 1999. Over the years I've programmed in Visual BASIC, PHP, Ruby, Perl, C#, SKILL, Ocean, Verilog-A, C++, BASH, AWK, VHDL, SPICE, MATLAB, ASP, Java, C, SystemC, Verilog, and probably a few I've forgotten. These days, it's usually Python, C and C++.
	2019-now	Python front-end to ciccreator – Python Simulation toolbox – Python Configuration toolbox – Python
	2009-now	Rapid layout generation tool for SAR ADCs – C++
	2017	Power meter blink to kWh using nRF52 – C/Python

	2015	Ocean_script.support.package – Perl
	2004	SystemDotNet.Report – C#
	2005	SystemDotNet: mixed-signal, discrete time, event driven simulator – C#
	2003	Time Tracker 2 – C#
	2001	NextGenLab.Chart – C#
Education	2004-2008	NTNU, Ph.D.
	1997-2002	NTNU, Master of Science
Publications		Carsten Wulff on Google Scholar Carsten Wulff on IEEE Xplore
Books	2003	Tor A. Fjeldly, Michael S. Shur “Lab on the Web: Running Real Electronics Experiments via the Internet” Chapter 4: Carsten Wulff, Trond Ytterdal, Thomas Aas Sæthre, Arne Skjevlan, “NEXT GENERATION LABORATORY - A solution for remote characterization of analog integrated circuits” , ISBN: 0-471-41375-5 , Wiley, 2003
Journal Papers	2017	Wulff, C ; Ytterdal. T. A Compiled 9-bit 20-MS/s 3.5-fJ/conv.step SAR ADC in 28-nm FDSOI for Bluetooth Low Energy Receivers , IEEE Journal of Solid-State Circuits, Vol: 52, Issue: 7, July 2017
	2010	Wulff, C ; Ytterdal, T. “Comparator-based switched-capacitor pipelined analog-to-digital converter with comparator preset, and comparator delay compensation” , Analog Integrated Circuits and Signal Processing, December 2010 , © Springer
	2009	L. Lewyn, T. Ytterdal, C. Wulff, and K. Martin, “Analog Circuit Design in Nanoscale CMOS Technologies” , Proceedings of the IEEE , Vol: 97 , No: 10, 2009 DOI: 10.1109/JPROC.2009.2024663 © IEEE
	2009	Wulff, C ; Ytterdal, T. “Resonators in Open-Loop Sigma-Delta Modulators” , Circuits and Systems I: Regular Papers, IEEE Transactions on, Vol. 56, No. 10, 2009, DOI: 10.1109/TCSI.2009.2015211 © IEEE
	2008	Wulff, C ; Knauserud, Ø; Ytterdal, T. “Switched Capacitor Analog Modulo Integrator For Application In Open Loop Sigma-Delta Modulators” , Analog Integrated Circuits and Signal Processing, February 2008 , © Springer
Conference Papers	2019	Garvik,H; Wulff, C ; Ytterdal,T A 68 dB SNDR Compiled Noise-Shaping SAR ADC With On-Chip CDAC Calibration ,IEEE Asian Solid-State Circuits Conference (A-SSCC), 193-194
	2017	Garvik,H; Wulff, C ; Ytterdal,T An 11.0 bit ENOB, 9.8 fJ/conv.-step noise-shaping SAR ADC calibrated by least squares estimation IEEE Custom Integrated Circuits Conference (CICC), 1-4
	2016	Wulff, C ; Ytterdal, T. “A compiled 3.5fJ/conv.step 9b 20MS/s SAR ADC for wireless applications in 28nm FDSOI” , 42nd European Solid-State Circuits Conference, 2016
	2016	Garvik,H; Wulff, C ; Ytterdal,T Noise transfer functions and loop filters especially suited for noise-shaping SAR ADCs , IEEE International Symposium on Circuits and Systems (ISCAS), 1034-1037
	2009	Wulff, C. ; Ytterdal, T. “CBSC pipelined ADC with comparator preset, and comparator delay compensation” . Proc. NORCHIP 2009 © IEEE.
	2008	Ytterdal, T; Wulff, C “On the Energy Efficiency of Analog Circuits in Nanoscale CMOS Technologies”, International Conference on Microelectronics (ICM2008). Invited paper.© IEEE.
	2008	Wulff, C. ; Ytterdal, T. “Design and behavioral simulation of comparator-based switched-capacitor circuits” . Proc NORCHIP 2008.© IEEE. Visual supplements
	2007	Wulff, C. ; Ytterdal, T. “Design Of A 7-bit, 200MS/s, 2mW Pipelined ADC With Switched Open-Loop Amplifiers In A 65nm CMOS Technology” . Proc NORCHIP 2007. ISBN 1-4244-1517-9 © IEEE. Visual supplements
	2006	Wulff, C. ;Knauserud,Ø; Ytterdal, T. “Analog Modulo Integrator For Use In Open-Loop Sigma-Delta Modulators” . Proceedings of NORCHIP 2006. © IEEE. Visual supplements
	2005	Lillebrekke, C. ; Wulff, C. ; Ytterdal, T. “Bootstrapped Switch In Low-Voltage Digital 90nm CMOS Technology” . Proceedings of NORCHIP 2005, © IEEE
	2005	Berntsen, Ø. ; Wulff, C. ; Ytterdal, T. “High Speed, High Gain OTA in a Digital 90nm CMOS Technology” . Proccedings of NORCHIP 2005, © IEEE
	2005	Wulff, C. ; Ytterdal, T. “0.8V 1GHz Dynamic Comparator in Digital 90nm CMOS Technology” . Proceedings of NORCHIP 2005, © IEEE
	2005	Francisco Colodro, Marta Laguna, Carsten Wulff, Trond Ytterdal and Antonio Torralba. “New approach for Continuous Time Sigma Delta Modulators” . Proceedings of NORCHIP 2005
	2004	Wulff, C. Erstad, R. Ytterdal, T. “Programmable Analog Integrated Circuit” . Proceedings of NORCHIP 2004. © IEEE
	2002	Wulff, C. Ytterdal, T. “Programmable analog integrated circuit for use in remotely operated laboratories” . International Conference on Engineering Education (ICEE-2002). Visual supplements
	2002	Wulff, C. Ytterdal, T. Sæthre, T.A. Skjevlan, A. Fjeldy, T.A. et al “Next Generation Lab - A solution for remote characterization of analog integrated circuits” . International Caracas Conference on Devices, Circuits and Systems (ICDCS-2002). © IEEE. Visual supplements

Educational Work	2008	Wulff, C; Ph.D. Thesis "Efficient ADCs for nano-scale CMOS technology" © Carsten Wulff Pipelined Schematics
	2002	Wulff, C; Master Thesis "Programmable Analog Integrated Circuit w/Table of Content" © Carsten Wulff
Unpublished Works	2014	Wulff, C; "The Universal Design Project" , 2014
	2008	Wulff, C; "An_ADC_primer" , stuff about ADCs that did not make it into my Ph.D. thesis. This is a rough cut, so there may be some trains of thought that might be difficult to follow.
	2006	Wulff, C; "FE8113_High_Speed_Data_Converters:_A_Summary"
	2006	Wulff, C; "Introduction to Mathematics of Noise Sources"
	2006	Wulff, C; "On Spectral Density"
	2005	Wulff, C; "A Brief Introduction to SystemDotNet"
Patents	2020	Exchange of ranging data
	2020	Ranging between radio devices
	2020	Radio frequency distance determination
	2020	Peripheral interconnect controller
	2020	Digital radio communications
	2018	Reference voltages
	2017	Power supply circuits
	2017	Integrated circuits
	2015	Integrated power-on-reset circuit
	2015	Analogue-to-digital converter
Co-Supervisor		
Ph.D. students	2021-now	Fredrik Esp Feyling
	2019-now	Olivia Mirea
	2015-now	Harald Garvik
Master Students	2021	E.V.R Robstad Mapping Wireless Network Nodes Automatically to a Predefined Set of Positions using Distance Measurements
	2021	M.G. Aalien Development and Optimization of a Contact Tracing Wearable
	2021	F.E Feyling Design Considerations for a Low-Power Control-Bounded A/D Converter
	2020	H. Nyholm Localizing Sheep using a Bluetooth Low Energy enabled Unmanned Aerial Vehicle for Round-trip Time of Arrival-based Multilateration C. Nielsen; Ultra Low Power Frequency Synthesizer
	2019	S. Balasubramanian; Behavioral Modelling and Design of Noise Shaping SAR ADC in 22nm FDSOI
	2015	H. Garvik; An energy efficient noise-shaping SAR ADC in 28 nm FDSOI E. Strandvik; Compensation of Threshold Voltage for Process and Temperature Variations in 28nm UTBB FDSOI T. Nornes Ultra-Low Power SAR-ADC in 28nm CMOS Technologies
	2006	Ø. Knauserud Investigation of errors in open-loop sigma-delta modulators utilizing analog modulo integrators
	2005	Ø. Berntsen High Speed, High Gain OTA in a Digital 90 nm CMOS Technology C. Lillebrekke Bootstrapped switches in low voltage nanoscale CMOS process L. Røysland Utvikling av testoppsett for en Programmerbar Analog IC M. Moksnes Design criteria for a 12-bit 2 Msample/s 1.8 V ADC for realization in 0.18µm CMOS technology
	2004	J. Daleng; ALEXIS - Automated Laboratory Experiment eXercise Interactive Setup F. Strand; NGAS – Next Generation Analog Station
	2003	V. Pedersen; NGL webgrensesnitt for FPGA med mikrokontroller
Hobbies		Trail-running, Rando and Bouldering

