

MICHAEL KAUTZ

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Geburtsdaten: 15.April 1972 in Cottbus



Executive Summary

Designer and development engineer; Management experience (technical 2 years); Design and adjustment of precision optical equipment in aerospace, development of fiber-optic and microtechnical sensors, spectrometers; Graduate engineer in mechanical engineering, Focus on design/microsystem technology; Professional successes: Working on Ready-to-series laser satellite communication terminal, IT skills: Creo 7.0, Inventor 2017, Solidworks 2017, Solid Edge 2020

Target positions

- Target industry: Optical industry / aerospace / medical technology
- Senior designer / development engineer / system developer of complex opto-mechanical or opto-electronic products

Core competencies

Industries

- Photonics, Aerospace Technology, Opto-Electronics, Life Sciences / Healthcare / Medical Technology, Optics

Leadership experience

- Professional 2 years for interns and master's students during the experiment activity and thesis at the Institute of Photonic Technologies

Expertise

- Design of precision optomechanical devices, preparation of fiberglass and microtechnical sensors; Construction, calibration of spectrometers, adjustment of optical devices, micro-, nanopositioning, micro-, nanometrology
- CAD applications: PTC Pro/E or Creo 7.0 (12 years. current), Inventor (9 years: 2000-2008, 2018), SolidWorks 2017 (1.5 years); Solid Edge 2020 (4 months); Analysis tools: MathCAD (20 years), Origin (8 years), ANSYS Workbench (2 years)
- Software development: LabView programming for measuring stations;
- Measuring techniques: Angle measurement with autocollimation telescopes, interferometric angle and position measurements
- Process techniques: climate tests on optical modulators, glueing, etching, assembly of fiber optic sensors

Personal skills

- Results orientation; analytical mind; Cooperation in multinational teams; interdisciplinary competences through cooperation with biologists, physicists, medical technicians, finishers, designers

Career

08/16 - to date

Freelance work as a designer

Member of the freelance network

Jencad.de Thuringian Engineers | Jena / Regensburg

- Optimization of a mirror-rotor connection for an oscillating mirror system - variant analysis, detailed construction, modal and harmonic analysis with ANSYS (SCANLAB)
- Design of a vacuum cryogenic measuring setup for a laser Ion trap including adjustment frame structures (MPE Garching)
- Design of adjustment, mounting and testing devices for a satellite-based spectrometer (OHB)
- Design of a light weight 500 mm astronomical mirror with mirror support and hard metal low friction cardan hinge (MPI)
- Conception of active adjustment systems for mobile miniature projectors, gripper design, construction laboratory assembly site (OSRAM)
 - Construction adjusting agent: Hexapod measuring station
 - Construction of micro needle gripper with piezo actuators
 - Hardware integration: hexapod, photodetector, cameras, computers
 - Software integration: Programming scan routines in LabView 18
 - Micro-, nano-positioning, micro-assembly of optical components
 - Micro-, nanometrology on miniaturized laser modules
 - Micro-contacting
- Motorized cable routing for a 4 m large telescope in Chile (AIP)
- Housing design for a ticket terminal (Systemtechnik Sömmerda)
 - Sheet metal and injection moulded parts, integration TFT display, printing unit, 1D and 2D scanner, connectors, PCBs, cooling, spring contacts

11/08 – 07/16

Freelance work as a designer

Engineering offices Steinbach-Könitzer-Lopez-Kautz | Jena

- Design for high-precision optomechanical assemblies and devices in the field of astronomy / aerospace in European projects
- Telescopes, spectrometers, beam dividers for satellite-based temperature measurements (Jenaoptronik), telescopic assembly support (Trefflich), large adjustment mirrors (IB Steinbach/OHB)
- Prototyping of lightweight vibration mirror systems for laser satellite communication (Synopta)
- Container solution for a mobile laser satellite communication terminal (Synopta)
- Design and commissioning of adjustment and calibration devices for length and angle measurements with auto-collimation telescopes (Synopta)
- Free-form surface modelling for a complex aluminum housing of a laser range finder, as well as modeling the inner optical carrier (Jenoptik ESW)
- Free-form surface modelling MRI patient beds in CFRP (Schmuhl)

(Change motivation: dissolution of the office by Prof. Steinbach)

04/00 – 10/08

Laboratory engineer

Institute of Photonic Technologies Jena e.V. | Jena

- Design, assembly and calibration of spectrometers for fibre-optic Bragg grating (FBG) sensors for temperature and strain measurement in European projects
- Development and integration of FBG sensors for electricity consumers in railway technology (Siemens) and strain sensors for wind turbines (Enercon)
- Construction of temperature-stabilized FBG Wavelength References (Siemens)
- Design and construction of a fiber-coupled free-beam optic setup for torque sensors (Siemens)
- Head of Innovation Project: Etched plasmonic micro and nano fiber sensors for DNA detection
- Professional support for interns / bachelor/ master students

(change motivation: project situation, new focus of the institute on bio-sensors)

9/98 – 03/00

Research assistant

Institute of Joining Technology and Material Testing Jena | Jena

- Design and technology development for fiber optic sensors, miniaturized disc lasers, wire-based Electron beam deflection systems
- Assembly and climate test on fiber-coupled modulators

(change motivation: dissolution of a working group of the microtechnology)

09/97 – 07/98

Diploma Thesis

Piezosystem Jena | Jena

- Hardware and software solution (LabView with integration of microcontrollers) for a semi-automatic Fiber waveguide coupling setup
- Interferometric stability measurements on fine adjustment elements

Vocational training

09/92 – 07/98

Study of mechanical engineering

Brandenburg Technical University Cottbus | Cottbus

- Focus: Design and microsystem technology
- Graduation: Dipl.- Ing. Mechanical Engineering

09/89 – 06/91

Vocational training with Abitur

Brieske Vocational School | Brieske

- Completion: Maintenance mechanic with Abitur

Knowledge and skills

Computer skills

MS-Office: very good (> 5 years)
Creo 7.0: very good (> 5 years)
Inventor 2017: advanced knowledge
LabView: advanced knowledge

Language skills

German: Native language
English: negotiable
French: Basics
Russian: Basics

Other knowledge

- MS Project (Basics)
- Data analysis: Origin 8 (8 years)
- PDM: Windchill 10.2 (3 years)
- FEM: ANSYS Workbench 14.0 (2 years, occasional use)
- Programming languages: HP VEE, Turbo Pascal 7.0, Fortran 77, C, LabView 18
- MathCAD Prime 3.0 (20 years)

Professionally, I offer you my experience for:

- Support in development and construction complex optomechanics systems
- Tasks in the design and technology development of optical, fiber optic and microtechnical assemblies
- Design and construction of prototypes as well as measurement and experimental setups
- Software development of LabView control software for measurement systems

I am a flexible and reliable employee. Through my professional and life experience, I have learned to work with others in the team.

Persistent and always highly motivated, I am opening up new tasks in order to successfully solve them in the interests of the agreed company goals and the customer.

Michael Kautz

Regensburg, January, 08, 2021

Cooperations with the following companies and institutes:



Contributions to publications

Schröder K., Ecke W., Kautz M., Willett S., Tchertoriski A., Jenzer M., Kaluza G., "Fiberoptical sensor network for defect monitoring on railway catenary", Proc. of SPIE, Vol. 6585 (2007)

Ecke W., Schroeder K., Kautz M., Joseph P., Willet S., Bosselmann T., Jenzer M., "On-line characterization of impacts on electrical train current collectors using integrated optical fibergrating sensor network", Proc. of SPIE, Vol. 5758, pp. 114-123 (2005)

Kerstin Schroeder, Wolfgang Ecke, Joerg Apitz, Elfrun Lembke and Gerhard Lenschow:
A fibre Bragg grating sensor system monitors operational load in a wind turbine rotor blade MEASUREMENT SCIENCE AND TECHNOLOGY, Meas. Sci. Technol. 17 (2006) 1167–1172

K. Schröder, J. Apitz, W. Ecke, E. Lembke, G. Lenschow: Fibre Bragg grating sensor system monitors operational load in a wind turbine rotor blade, 17th International Conference on Optical Fibre Sensors, edited by Marc Voet, Reinhardt Willsch, Wolfgang Ecke, Julian Jones, Brian Culshaw, Proceedings of SPIE Vol. 5855, pp. 270-273 (2005)

Yiping Wang, Hartmut Bartelt, Wolfgang Ecke, Reinhardt Willsch, Jens Kobelke, Michael Kautz, Sven Brueckner, and Manfred Rothhardt : Fiber Bragg Gratings in Small-Core Ge-Doped Photonic Crystal Fibers. JOURNAL OF ELECTRONIC SCIENCE AND TECHNOLOGY OF CHINA, VOL. 6, NO. 4, DECEMBER 2008, S. 429 ff.

Details about the processed projects

Aerospace

Projects	Details to Projects
Adjustable mirror with mount, mirror diameter 1200 mm	Vertical mounting, light-weight mirror mount, forcible storage, weight relief in the push / pull principle with the aim of a maximum deformation of the mirror surface of <5 nm P / V, hoists
Prototype construction of lightweight mirror systems for laser satellite communication	Modeling, drawing production, production control mirror system and electromagnetic drive systems
Telescopes	Modeling lens mount, temperature expansion compensation mechanism
Spectrometer	Modeling lens mount, temperature expansion compensation mechanism, GRISM socket with temperature expansion compensation mechanism
Beam splitter for satellite based temperature measurements	Design concept, modeling, drawing production, production control Dichroic holder, silicon slit with 200 nm flatness, temperature expansion compensation mechanism, diaphragm construction, housing construction

Design and commissioning of calibration and calibration devices for length and angle measurements	S. Measuring and testing techniques
Telescope mountings	Modeling, drawing production for a 40 kg telescope with search telescope and automatic positioning, table for rotatable mirror system of a laser satellite communication platform

Medical technology

Projects	Details to Projects
EEG electrode pressing system	Modeling, drawing production, technology development for a pressure system of 22 electrodes including amplifier
Handle for teleoperator surgery system	Study for various concepts for operating interfaces for a teleoperator
Free-form surface modeling for an MRI patient bed in CFRP	Modeling patient bed and mold form

Fiber optic spectral sensors

Projects	Details to Projects
Design and construction of a fiber-coupled free-wheel system for torque sensors	Design housing, integration of prisms, collimators, glass fibers
Development and integration of sensors for current collectors in railway engineering as well as strain sensors for wind power plants	Development sensor recordings, integration in aluminum, coal, GRP, concrete, sensor application in railway and wind power plants, development of temperature stabilization for reference sensors and spectrometers
spectrometer	Mechanics design for spectrometers for fiber Bragg grating sensors, multi-channel variants, integration of temperature-stabilized wavelength references, setup, calibration

Micro- and nanotechnology

Projects	Details to Projects
Miniaturized Disc Laser	Soldering device, masking signal for gold coating of laser crystals with $D = 1.2 \text{ mm}$
Wirebased electron beam deflection systems	Design of an etched silicon wafer for the reception of gold wires with $D = 100 \text{ }\mu\text{m}$, development of the production technology
Design and technology development for fiber optic sensors	Laser-cut positioning plates for glass fibers $D = 125 \text{ }\mu\text{m}$ to produce a fiber line with 13 fibers, spacing $130 \text{ }\mu\text{m}$
Plasmonic fiber Bragg Grating Bio-sensors	Development of a technology for etched Fiber Bragg Gratings, coating with gold, spectral evaluation for the detection of DNA binding reactions

Measuring and testing technology

Projects	Details to Projects
Design and commissioning of calibration and calibration devices for length and angle measurements	Integration of angle-measuring systems, autocollimation telescopes, reference mirrors, double-image prism, construction, lapping and adjustment of mirror pentaprisms to $0.1 \text{ }\mu\text{m}$, lapped linear guides,
Measuring station Adhesive grippers	Control of a measuring station for an adhesive gripper with HP VEE
Measuring station Fiber waveguide coupling	Control of a semi-automatic device for fiber-waveguide chip coupling, development of the control software in LabView, microcontroller control in C
Measuring station Fiber Bragg reference grating	Control of a measuring station for the automated recording of wavelength-temperature curves Temperature-compensated fiber Bragg reference grating, control in DELPHI

Housing construction

Projects	Details to Projects
Laser Range Finder	Freeform surface modeling for a complex housing Al housing with wall thickness 0.8 mm , rubber coating, belt holder, Shutter, complex optical carrier made of Al for the inclusion of a prism, the IR optics and the laser diode Rangefinder module
Ticket service terminal	Housing construction for a ticket terminal (sheet metal, injection-molded parts), integration flat screen, printing unit, scanner, sensors, circuit boards