

## Dr Erwin Hack: R&D-Projects

Years	Funding Agency <sup>i</sup>	Project Acronym Contract No	Duration <sup>ii</sup>	Total Funding	Funding share	Role <sup>iii</sup>	Topic <i>Contributions of Erwin Hack</i>
2020-2021	FFAG	SCIBAFFI  20200331_07	18	87'440 CHF	87'440 CHF	PI	Project with Swiss THz on Scalable Integrated Band-Pass Filter Fabrication (SCIBAFFI). Design, Optimization and Fabrication of band-pass filters for application in THz cameras or other laboratory applications. <i>Principal investigator</i>
2019-2021	EU H2020	DIMES  GA 820951	27	1'199'901 €	413'125 €	Partner	Clean Sky 2 Project. <i>Development of integrated measurement systems for a structural health monitoring system on an airplane.</i> In collaboration with Empa-lab Mechanical Systems Engineering.
2017-2020	EU H2020 (SBFI)	MOTIVATE  GA 754660	36	492'876 € (EU partners only)	195'286 CHF (SBFI contribution)	Partner	Clean Sky 2 Project. <i>Development of a best practice guide for validation experiments in an industrial environment; design and performance of a mechanical validation test</i> in collaboration with Empa-lab Mechanical Systems Engineering.
2015-2019	SNSF	THz-skin 200021_160078	48	239'353 CHF	239'353 CHF	PI	THz imaging of the interface between skin and textiles in mechanical contact. <i>Principal investigator; built up the Empa THz laboratory; realisation of holographic imaging and reconstruction</i>
2018-2019	ETH	THz fields 5213.00142	18	50'000 CHF	50'000 CHF	PI	Manipulation of electron transport in graphene using THz fields. Seed money from an ETH source.
2014-2017	CTI	LIDT 16871.1 PFNM-NM	35	723'680 CHF	60'000 CHF	Partner	Characterization and modelling of laser induced damage in optical coatings. <i>Managing analyses of the coatings at Empa; elucidating the damage mechanisms through coating and interface; ellipsometry measurements.</i>
2013-2014	EU FP7	VANESSA  NMP3-SA-2012-319116	18	492'503 €	105'000 €	Partner	Validation of numerical engineering simulations using calibrated camera-based instrumentation. <i>Vice chair of the CEN workshop; organisation and evaluation of an inter-laboratory study on calibration of full-field measurement systems; development of an image based validation methodology.</i>
2012-2013	Fischli-Stiftung	Tonewood	36	105'000 CHF	20'000 CHF	WPM	Fungal treatment of tonewood for musical instruments. <i>Measurement of eigenmodes using stroboscopic speckle pattern interferometry.</i>
2010-2012	CTI (EU FP7)	AMUSED  CTI-10701.3 PFIW-IW	24	160'000 CHF	160'000 CHF	PI CTI Partner EU	Integrale Schadensbeurteilung von faserverstärkten Strukturen mittels Simulation und Experiment. <i>Principal Investigator for the national CTI project within the MATERA+ umbrella. Measurement and analysis of torsion cylinders using speckle pattern interferometry and lock-in thermography; integration of data from x-ray CT and ultrasound.</i>
2008-2011	EU FP7	ADVISE  GA 218595	36	1'836'539 €	452'351 €	PI (Coo)	Development of reference materials for optical methods of dynamic measurement, specifically their use in validating numerical models. <i>Proposal preparation and submission; negotiation of the contract; management of the partnership; development of reference devices for dynamic deformation measurement</i>
2007-	SNSF	Adaptive	48	95'408 CHF	95'408 CHF	PI	Adaptive contrast and resolution enhancement for real-time life-cell light

2011		optics - microscopy		95'961 CHF	95'961 CHF		microscopy and adaptive control of laser speckle fields in microscopy <i>Development of high depth of focus imaging in microscopes based on reflective liquid crystal arrays; development of a method for measuring thickness and index of refraction of a microscopic sample in-situ .</i>
2007-2008	CTI	Intra-ocular lens	12	75'240 CHF	75'240 CHF	PI	Development of intra-ocular lenses with increased depth of focus. <i>Principal investigator; proposal preparation and submission; design of high depth of focus using ZEMAX and Matlab simulation and adaptive optics</i>
2007	SLS	Wood swelling	6	-	-	PI	Structural investigation of wood under three point bending and water swelling. Digital volume correlation with Luleå Technical University. <i>Principal Investigator, beam time responsible.</i>
2003-2005	EU FP5 (BBW)	SPOTS G6RD-CT-2002-00856	36	1'500'000 €	140'350 CHF	Partner	Development of reference materials for optical methods of strain measurement. <i>Design of the reference material; development of the traceability chain for strain measurements; development of the calibration methodology.</i>
2002-2004	Empa-EPFL	Adaptive optics-speckle	36			PI	Adaptive Optics applied to speckle interferometry and superresolution <i>Principal investigator; proposal submission; development of speckle reduction techniques based on liquid crystal displays for phase and amplitude modulation; design of a complex pupil filter for achieving superresolved images.</i>
2001-2004	EU FP5 (BBW)	HIRONDELLE GRD2-2000-31825	36	1'383'000 €	453'720 CHF	Technical Coo	Development of a fibre-bundle based speckle interferometer for microelectronic applications. <i>Proposal preparation; design and prototyping of an interferometer for measuring the deformation of solder joint arrays based on imaging fibre-bundles and micro-optics.</i>
2000-2002	CTI	WAPISMO	24	835'411 CHF	135'000 CHF	WPM	Development of a robot for optical and ultrasonic inspection of water pipes. <i>Integration of a Pan/Tilt/Zoom dome camera into the water robot; programming of its control and development of the GUI in C++.</i>
2000	SNSF	Interferometry in speckle light	12		5'000 CHF	Co-Chair	Conference held in Lausanne 2000. <i>Co-Chair</i>
1998-2000	CTI Medtech	Compojoint	24	580'000 CHF	175'000 CHF	Partner	Development of a hip prosthesis made of CFRP. <i>Measurement of the deformation pattern of implanted hip prosthesis of different material under load; validation of FE results.</i>
1997-1999	EU FP4 (BBW)	MuWas BRPR-CT96-0272	36	1'105'000 ECU	426'600 CHF	Partner	Development of a multi-wavelength shearography sensor for measuring strain fields. <i>Design and building of two prototypes with three integrated CCD cameras and laser diodes for simultaneous 3D deformation measurement; presentation of the prototype at the laser fair in Munich</i>
1997-1998	Esa / ESTEC	ERA	12			WPM	Verification Tests of the European Robot Arm for the International Space Station. <i>Qualification test of the European robot arm (ERA); assessment of the flight and spare modules; measurement of impact damage with speckle pattern interferometry</i>
1993-1995	PP Optique	3D-imaging	36			WPM	Development of a multi-wavelength distance sensor for high-resolution 3D-imaging of non-cooperative targets. <i>Stabilization of tuneable high power laser diodes; development of multi-wavelengths techniques for shape measurement</i>

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