GEMTELLIGENCE

100 Jahre Erfahrung in einer Software

Philipp Schmid



CSEM - TECHNOLOGY ORGANIZATION IN SWITZERLAND

Technology Transfer to Industry

cser



CSem

APPLIED RESEARCH

Development of deep technology bricks through public funding

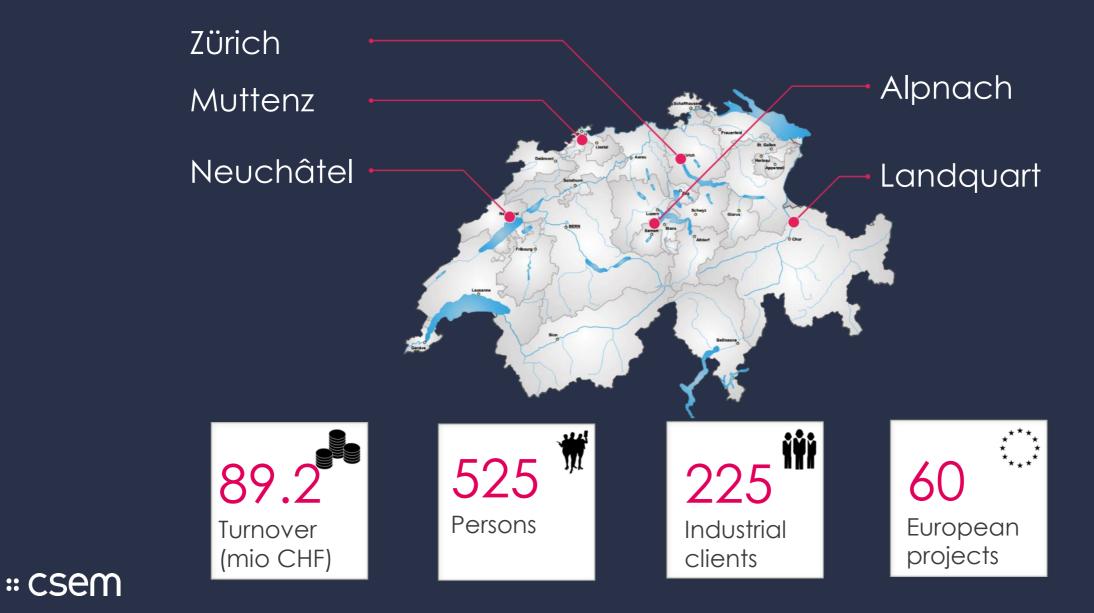




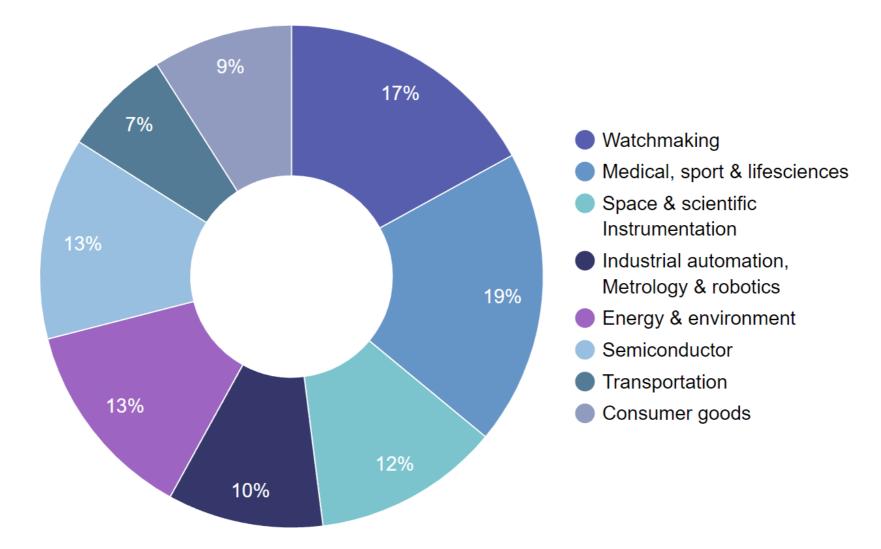
Valorization through direct industry mandates following a full cost model (time and material)

TECH TRANSFER

Close to industry

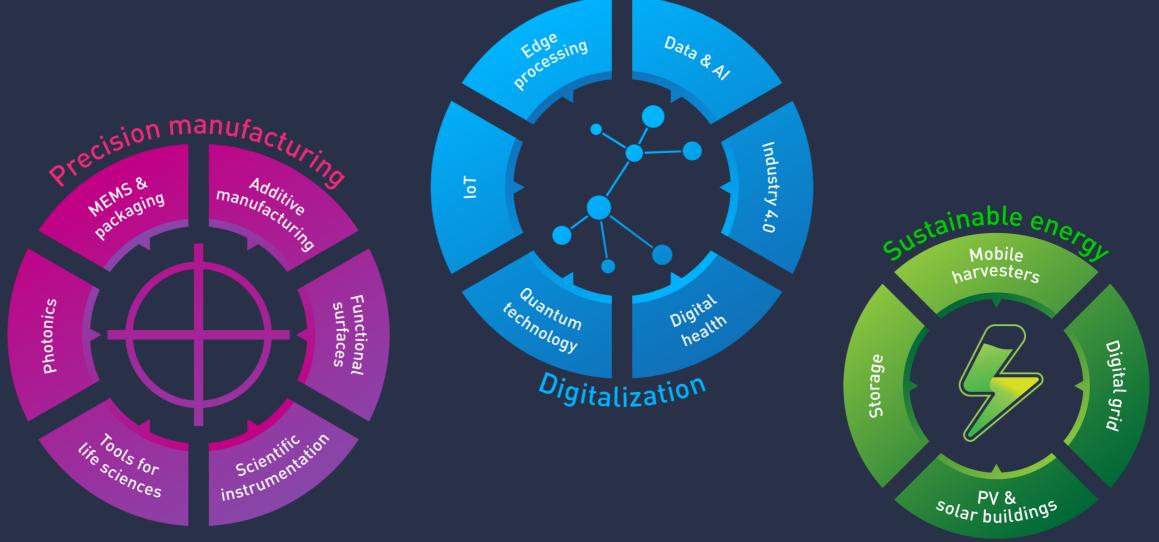


225 industrial customers served in 2020



:: CSEM

Technologies in focus at CSEM



" CSEM

Industry 4.0 & Machine Learning

Quality and Process Control



Predictive Maintenance



Digital Manufacturing



« Highest Efficiency and Perfect Quality »



WHAT DOES A GEMOLOGICAL LABORATORY DO

Service Provider for the Industry: Gemological Reports

Determination of identity, authenticity, and origin of gemstones based on material-science analysis



What defines the value of a gemstone?

Origin!

sold at auction for US\$ 6,900,000

(same stones from **Madagascar**: below US\$ 1,000,000)

Bracelet with nine sapphires from Kashmir

What defines the value of a gemstone?

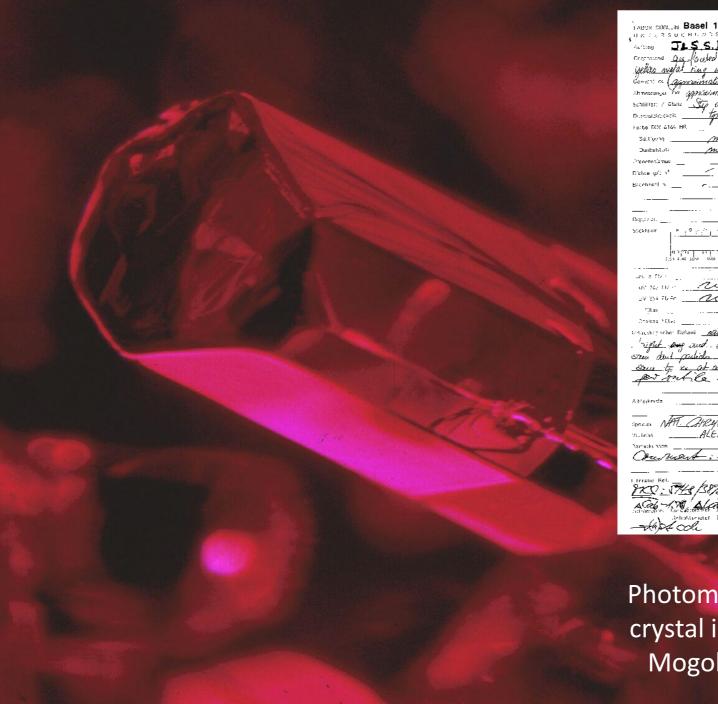
Authenticity!



Weight:	5.14 ct
Species:	Natural ruby
Origin:	Burma
Sold for:	US\$ 600'000
Condition:	untreated



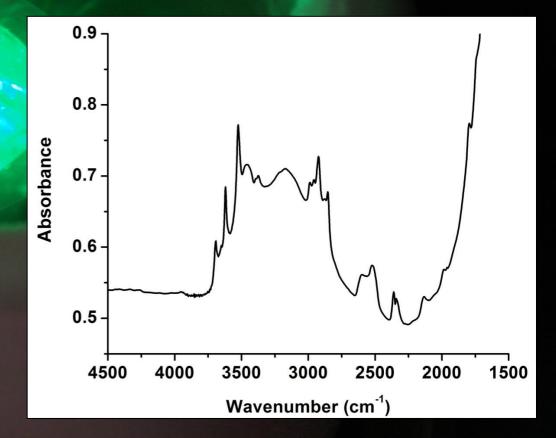
Weight:	5.62 ct
Species:	Natural ruby
Origin:	Burma
Sold for:	US\$ 30'000
Condition:	heated



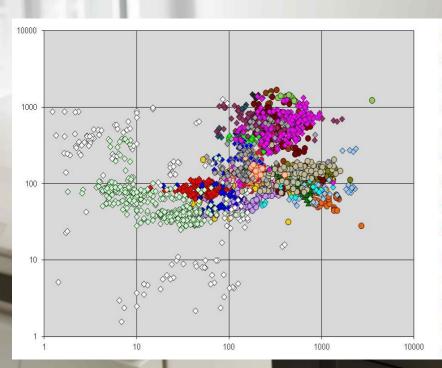
Date in 24 APR 98 TABOR SUBLIN Basel 1998 9804359 where \mathscr{D} **ОК**ИД**АЗОСН**ОМЪЗООВО И Däte due JISS. DE YOUNE (LOF 135) Start date sendone (tested in the morenting based Date out protein new dimende Recheck exď. Databank search mainistik 1260 × 10.60 × 7.42 FOR OCTA 2042 any shows O'Ran th 12.9 no Batani <u>natural - probine</u> licaled pressures And and angales grade Aucture and dread west to me at our end tile shart Autile readles (or dea - modelVD CLIBU HRUSOBERHL ALEXANDRITE mart : Harry council re-Die Gereiten U. Dienersten C. Bernersten G. Pelansken G. Pelansken Antroducenteter) Spectroscop C (19 mage 0 and Docentification) () 78 Autocitimana B

Photomicrograph of an apatite crystal included in a ruby from Mogok, Burma (Myanmar).

Spectroscopic properties



Chemical Fingerprinting



Afghanistan (Lakhman)
Afghanistan (Panshir)
Brazil (Itaberai; Goias)
Brazil (Itabira; Minas Gerais)
Brazil (Itatiaia mine; Minas Gerais)
Brazil (Movte Santo do Tocantins)
Brazil (Socoto / Carnaiba; Bahia)
Brazil (Santa Terezinha; Goias)
A China (Xin Jiang)
China (Yunnan)
Madagaskar
Mozambique

Laser Ablation – Inductively Coupled Plasma – Mass Spectrometry

GROUND TRUTH

BOX 15 A

SAPPHIRE

BOX 15_B

SAPPHIRE

BURMA, MOGON

MIXED (Australia, Burma

nbia, Russia, USA

Reference stone collection

BOX 16_A

BOX 16 B

SAPPHIRE

MADAGASCAR (Ilakaka/Sakaraha)

SAPPHIRE MADAGASCAR (General, Andranondambo, Ambondromifehy, Vatomandry)

28'000 Samples from all commercially relevant gemstone mines in the world

100

A TAOS

BOX 17

SAPPHIRE

BOX 16_C

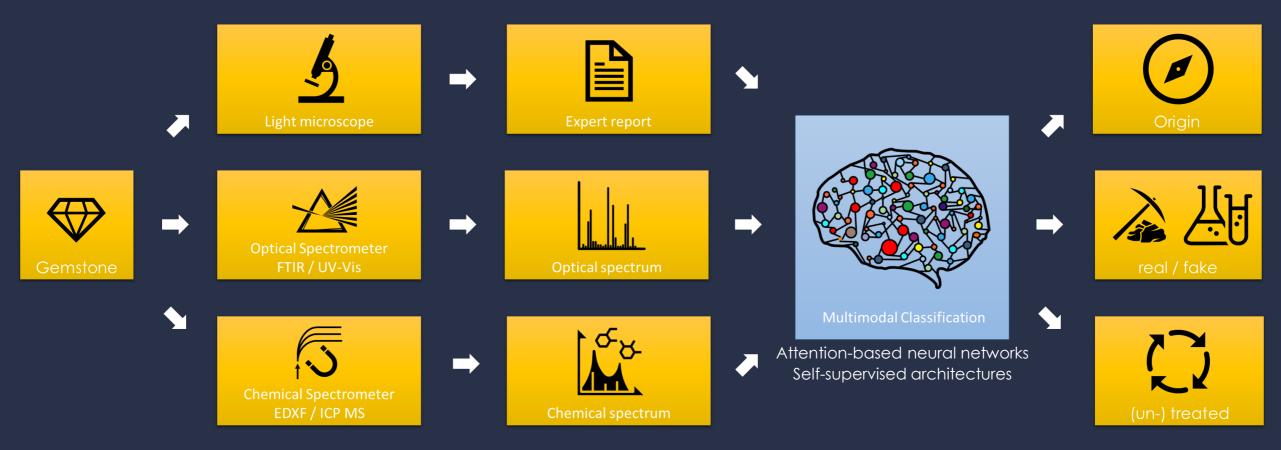
SAPPHIRE

BCH 13 8

SCE "E A

BOX 29

Expert Experience into AI Software



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BUILDING A GEMSTONE SUPER-EXPERT

R&D

Español Français By Serge Maillard MARCH 2021 Far greater volumes of gemstones, evaluated automatically? This is the promise offered by Swiss jewellery house Gübelin, which has joined forces with CSEM to develop a revolutionary data processing tool using artificial intelligence and machine learning. This new technology also opens up some exciting prospects for the watchmaking industry.









Contact

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