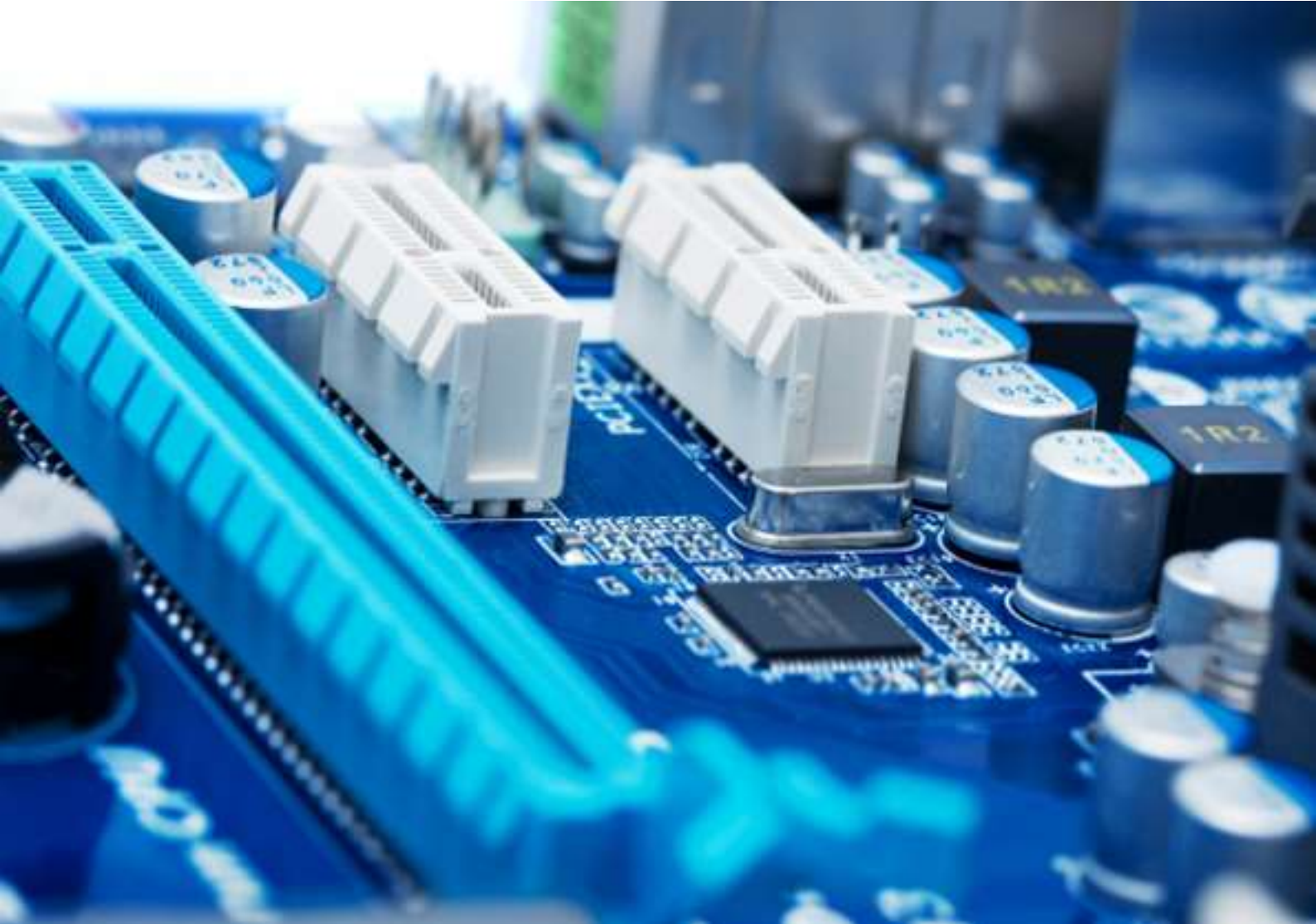




# RungeENGINEERING



Your specialist for  
hardware and  
embedded software  
development



RungeENGINEERING



## When Science meets Engineering - Eureka!

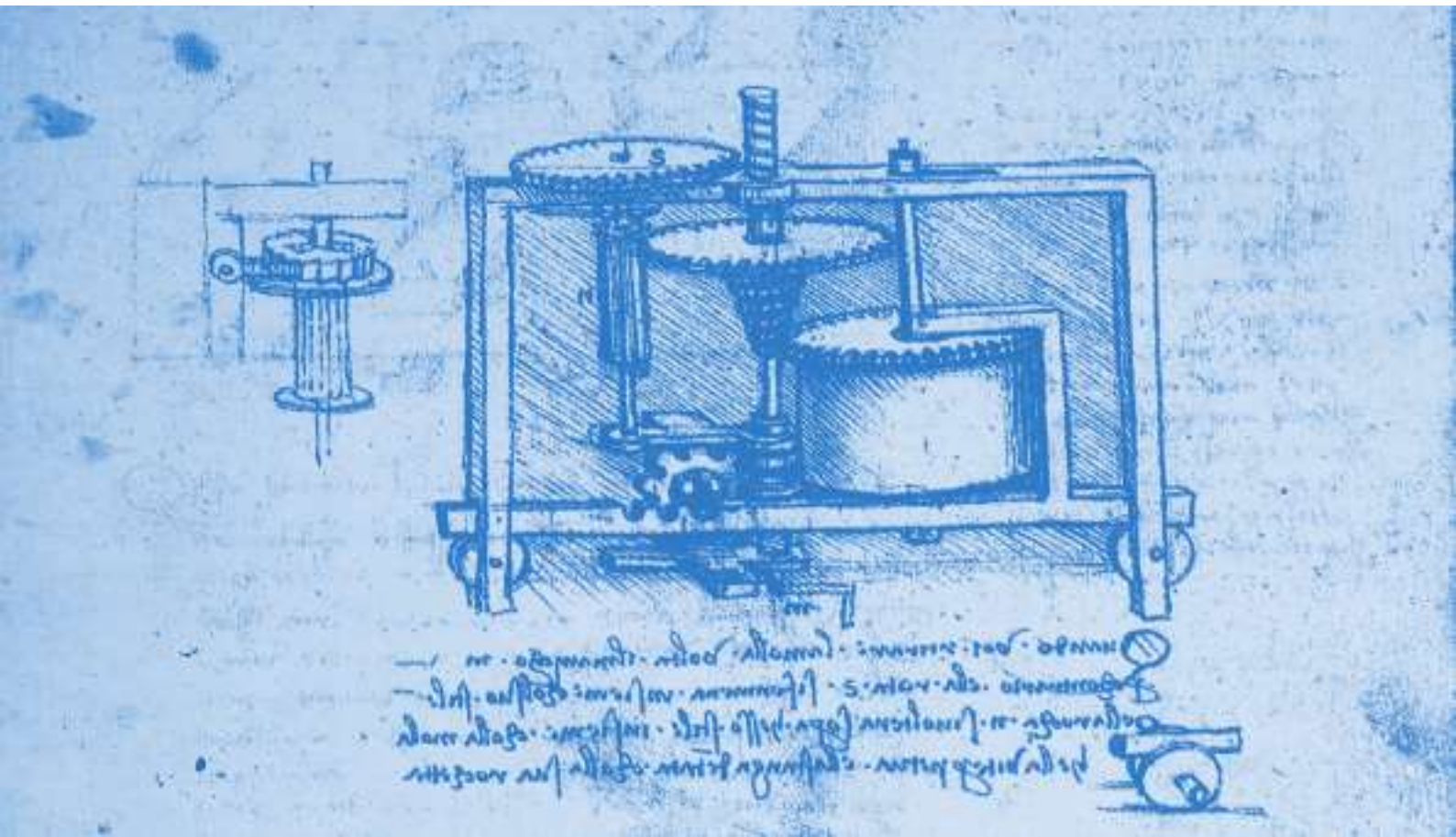
When Archimedes exclaimed Eureka!, he expressed perfectly the feeling we get when insight and experience, mixed with science and engineering expertise, solves a previously unsolvable problem.

That's what we specialise in at Runge Engineering - creating Eureka! moments for our clients and partners, to create elegant and practical solutions to complex challenges.

We understand how to combine fast-evolving technology and science with classic, problem-solving techniques that have stood the test of time.

Problem-solving and philosophy are a core component of the curricula at some of the most renowned engineering universities in the world. They understand that studying the ancient philosophers not only enhances personal development, it hones the ability of budding engineers to gain precise insight into any problem that needs to be solved.

At Runge Engineering we specialise in combining problem-solving with science, electronics and engineering to find the optimum technical solution. We call this method 'scientific engineering'.





## Dipl.-Ing. Andreas Runge - Founder

A talented electrical engineer and computer science expert, DI Runge founded RungeENGINEERING in 2015 to provide scientific engineering consultancy, development and implementation for a wide range of clients.

Dipl.-Ing. Runge has an advanced level of technical, management and leadership skills. He has a Masters in Electrical Engineering and Information Technology from the world-renowned RWTH University in Aachen and has also undertaken international technology and science studies in Austria and the USA. He is expert in general electrical engineering, microsystem technology including laser technology, AC/DC electronics circuit- and software for embedded systems.

Dipl.-Ing. Runge has more than 20 years' experience working on complex technology projects at some of the worlds most advanced engineering companies, including Infineon Technologies, Winterthur Technology, B.E.G. Brück Elektronik and SCHIEBEL.

### scientific papers

- Final thesis at the ICT of the Technical University, Vienna: "Design and optimisation of a microcontroller based demand-side management for smart grids".
- Seminar paper: "Development of a reading station for sensors with pulse width modulated output signals".

### languages

- German: first language
- English: business fluent
- French: conversations







## What we offer

Hardware development - analogue, digital and general electrical engineering

- Sensor technology, testing and laboratory installations (with IT networks)
- Analogue circuitry
- Microcontroller-based digital technology
- Integrated circuits
- Low and high power design

PCB layout

- Schematics and board design
- EMC-compliant PCB unbundling

Abstraction

- Mathematical modelling
- Algorithm development
- Numerical analysis

Embedded software development

- Time-critical applications
- Industrial standard microcontrollers

Casing design

- Collaboration with designers
- 3D printing prototypes
- Injection moulding

Prototype development and transition to mass production

- Design for manufacturing
- Collaboration with EMS service providers
- Conformity testing and expert opinions
- Distributed sensor and actuator systems
- Human-machine interfaces (GUI / BCI)





## RungeENGINEERING - Case Studies

### **“SMART HOME” system for B.E.G. Brück Electronic**

Development of a compact wireless roller shutter actuator (flush-mounted sensor and actuator system) through to serial production.

Complete hardware and software development (in C on STM8  $\mu$ C), from the original concept through to pre-series production.

Casing design and prototype development, also using 3D printing

Supply chain management and quality management.

Supervision of spin-off products like smoke detectors.

### **Machine tool controls at Winterthur Technology AG (3M)**

CNC and NC-Kernel Software development for WENDT precision grinders

Coordinate transformations, linear algebra, numerical analysis and conversion to Visual Basic, .NET, C, C++, G-code, Linux and Microsoft Environment

### **Civil engineering consultancy**

Example: Expert opinion for a construction site in the Eifel National Park

Combined Power and Heat, CECAD, University of Cologne

### **Manufacturer of large drones for humanitarian operations**

Construction of a test bench for quality assurance

### **IT-Projektgenossenschaft eG**

Hardware development of Brain-Computer-Interface (BCI)





## Expertise - Tools



RungeENGINEERING is expert in many development tools and microcontrollers. We read documentation, books, IEEE papers, VDE publications in English and German.

Autodesk Eagle and Autodesk AutoCAD (for TGA)  
ARM Atmel, ST STM8 and STM32, Infineon, ESP32 environment  
Avionics environment  
Bosch MTX  
C  
C++  
Confluence / Jira  
eclipse  
GoLive  
Javascript  
Keil  $\mu$ Vision  
Laboratory engineering, proprietary test equipment  
NI Labview  
NodeRed  
Nokia Impact  
NB-IoT  
Maker environments (Arduino et al.)  
Matlab  
Mentor  
Microcontroller programming using C / Assembler  
Microsoft Windows and Office applications  
MIL VTOL / UAV  
Test equipment (some of which were complete proprietary developments)  
Pspice Target3001  
Python Thonny IDE  
QT  
RedHat Linux  
ST development environment  
TCP/IP NTP MQTT  
Visual Basic  
Visual Studio.NET  
Wireshark  
WLAN and Bluetooth Module, ISM and BOS wireless technology





## RungeENGINEERING - Client Project Partnership

**Every successful client project is a partnership.**

At Runge, we pride ourselves on offering flexible expertise, via:

individual consultants or contractors  
Specialist, expert project teams

Our extensive network includes 'champions' from the fields of:

Rapid PCB equipping (rapid prototyping)  
PCB equipping for serial production  
PCB procurement  
Casing design  
3D printing  
Plastic injection moulding  
Drone construction  
Foreign Affairs  
Development and humanitarian aid  
Research for standards, publications and subsidies  
CPS Hub NRW, Ministry of Digitalisation  
Digital Capability Center, Prof. Griss, RWTH Aachen University  
Publicly-appointed experts from the Chamber of Skilled Crafts (HWK), Cologne

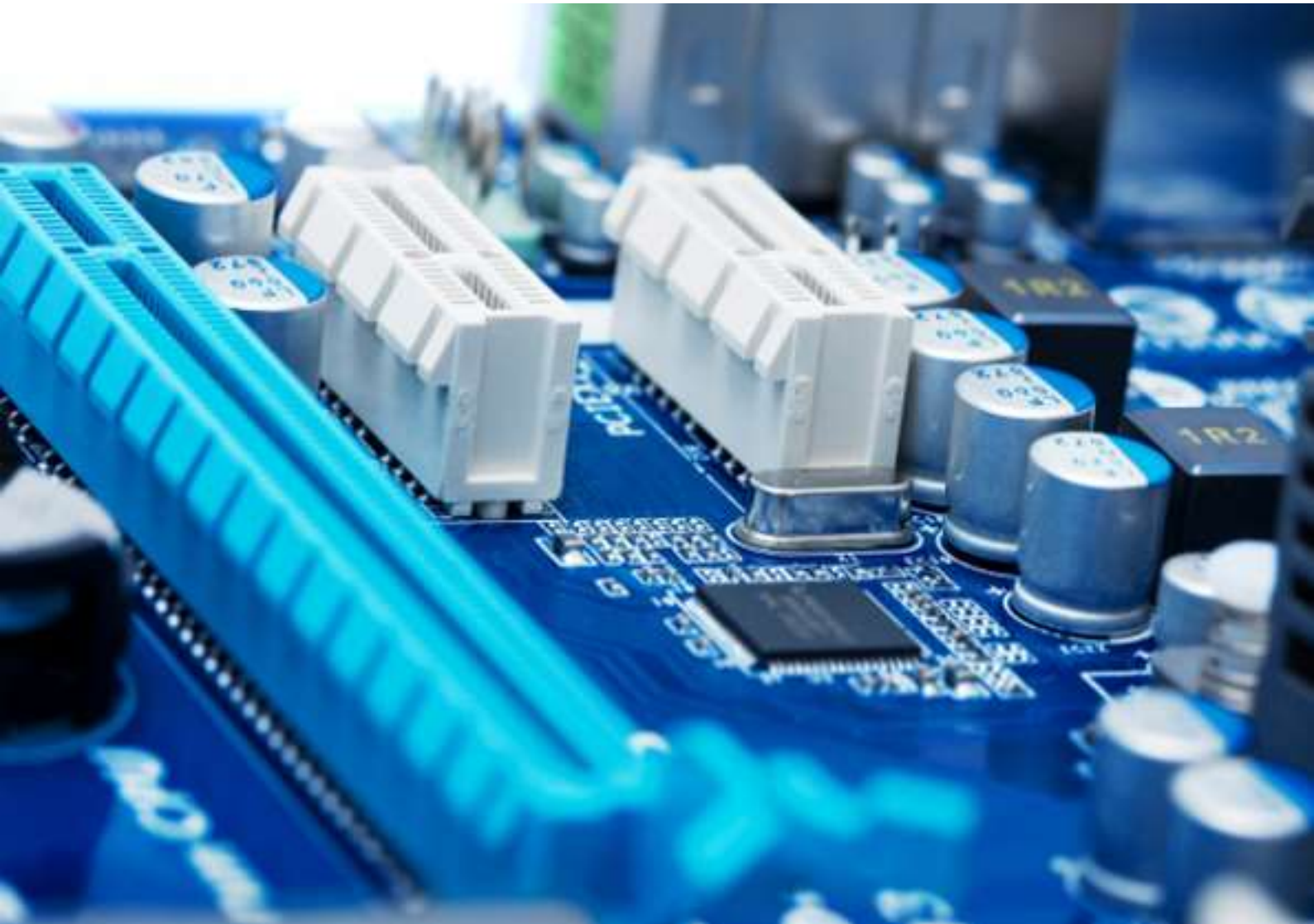
### **Academic Links**

Runge maintains close links with Aachen University RWTH and the Technical University of Vienna.





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