

A3

## SCIENCE and RESEARCH



AI:cube



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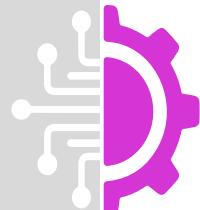
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## WHO WE ARE



ACUBE (A<sup>3</sup>) IS AN AI COMPANY THAT DEVELOPs MATHEMATICALLY BASED AND RELIABLE MACHINE LEARNING SYSTEMS.

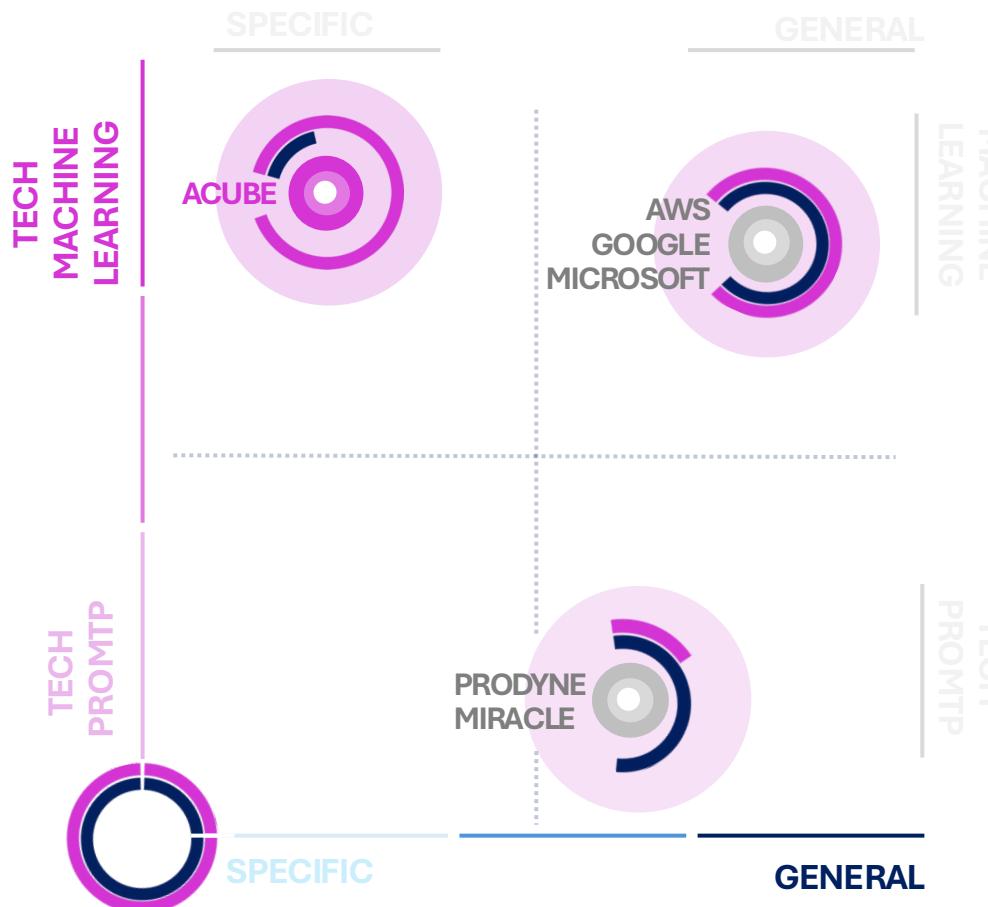
ACUBE (A<sup>3</sup>) TURN FRONTIER METHODS INTO VALIDATED PROTOTYPES AND READY TO MARKET SOLUTIONS



ACUBE (A<sup>3</sup>) IS ABLE TO DESIGN AND DEVELOP **NEW ARCHITECTURES** IN THE FIELD OF **MACHINE LEARNING** FOR SCIENCE AND RESEARCH PURPOSES BY CONTROLLING AND GOVERNING THE MATHEMATICAL LAYER.

ACUBE (A<sup>3</sup>) HAS TEAMS ACROSS ALGORITHMIC DESIGN, APPLIED ML, MLOPS, AND EVALUATION/ASSURANCE

# «WHERE» WE ARE



**CREATORS:** COMPANIES THAT DESIGN AND DEVELOP PROPRIETARY ALGORITHMS AND CORE TECHNOLOGIES

**SYSTEM INTEGRATORS:** COMPANIES THAT ASSEMBLE AND COMBINE EXISTING TECHNOLOGIES INTO COMPLETE SOLUTIONS

# TEAM AND COMPETENCE AREAS



## TEAM

## WHO YOU'LL WORK WITH



## MAIN COMPETENCE AREAS

## MAIN COMPETENCE AREAS

### FOUNDATIONAL & THEORY

ML THEORIST / STATISTICAL LEARNING  
OPTIMIZATION RESEARCHER  
PROBABILISTIC ML / BAYESIAN  
GEOMETRIC & TOPOLOGICAL ML  
CAUSAL ML / COUNTERFACTUALS

### MODELS & METHODS

REPRESENTATION & SELF-SUPERVISED LEARNING  
FOUNDATION-MODEL RESEARCHER (FM/LMM)  
REINFORCEMENT LEARNING / MULTI-AGENT  
NEURO-SYMBOLIC / PROGRAM SYNTHESIS  
MECHANISTIC INTERPRETABILITY

**SYSTEMS, EFFICIENCY & DEPLOYMENT**  
ML SYSTEMS / COMPILERS - EFFICIENT ML  
MLOPS RESEARCH ENGINEER

**TRUST, SAFETY & GOVERNANCE**  
ROBUSTNESS & RELIABILITY  
FAIRNESS, ETHICS & POLICY, PRIVACY &  
SECURITY

**SAFETY & ALIGNMENT, VERIFICATION & FORMAL  
METHODS**

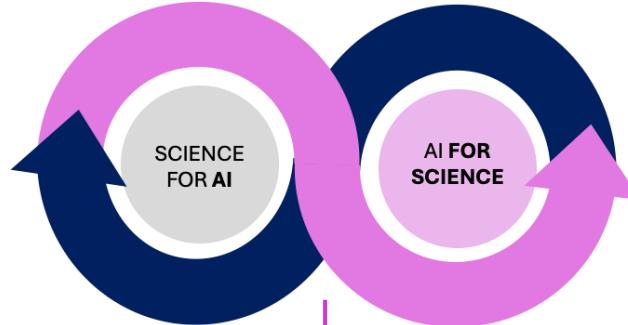
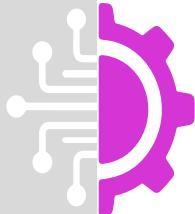
**DATA, EVALUATION & INTERACTION**  
DATA-CENTRIC ML - BENCHMARKING &  
EVALUATION SCIENCE  
HUMAN-AI INTERACTION / XAI

## TEAM

ACUBE HAS A HIGHLY QUALIFIED TEAM  
OF **MATHEMATICAL MODELLERS**,  
**SOFTWARE ENGINEERS**, **DATA  
SCIENTISTS**, **SOFTWARE ARCHITECTS**,  
DEVOPS ARCHITECTS, AND FULL-STACK  
ENGINEERS.

# WHY ACUBE?

## UNLEASHING THE POTENTIAL OF SCIENCE



COLLABORATING WITH ACUBE MEANS PARTNERING WITH A TEAM THAT **TURNS CUTTING-EDGE SCIENCE INTO RELIABLE VALUE**. IN A WORLD WHERE ARTIFICIAL INTELLIGENCE IS REDEFINING HOW ORGANIZATIONS OPERATE, THE DIFFERENCE IS NOT JUST TECHNOLOGY, IT'S THE PEOPLE WHO DESIGN IT, INTEGRATE IT, AND USE IT RESPONSIBLY. WE PROVIDE USEFUL, SAFE, AND SUSTAINABLE **ARTIFICIAL INTELLIGENCE** THAT CREATES REAL IMPACT IN TERMS OF **SCIENTIFIC DISCOVERY**. WE **APPLY SCIENCE** THROUGH CONTINUOUS RESEARCH IN **ARTIFICIAL INTELLIGENCE**

**ALGORITHMIC DEPTH** (MATHEMATICAL LAYER) AND **ENGINEERING AT SCALE**, FROM PROOFS TO ROBUST SYSTEMS

**EVALUATION FIRST**: CALIBRATION, OOD, FAIRNESS, SAFETY-BUILT IN FROM DAY ONE

**INTEROPERABILITY BY DESIGN**, SCHEMAS/ONTOLOGIES, APIs, STANDARDS ALIGNMENT

**OPEN SCIENCE MINDSET**, REPRODUCIBLE CODE, MODEL/DATA CARDS AND LEAN COLLABORATION

# A3 RESEARCH?

## VISION & PILLARS



WE BELIEVE IN DOING SCIENTIFIC RESEARCH THAT UNDERPINS MACHINE LEARNING: THEORIES OF UNCERTAINTY AND CALIBRATION, GEOMETRY/OPTIMAL TRANSPORT, AND GRAPHICAL/CAUSAL STRUCTURES. MODELS THAT ARE PROVABLE, RELIABLE, AND GENERALIZABLE

MATHEMATICAL FOUNDATIONS FIRST, PROOFS AND GUARANTEES WHERE POSSIBLE; FORMALIZING UNCERTAINTY, ROBUSTNESS, AND EXPLAINABILITY AS MEASURABLE MATHEMATICAL OBJECTS

TRUSTWORTHY MULTIMODAL AI, INTEGRATE IMAGES, SIGNALS/TIME-SERIES, TEXT/DOCUMENTS, AND GRAPH/TABULAR CONTEXT INTO SHARED REPRESENTATIONS THAT TRANSFER ACROSS DOMAINS

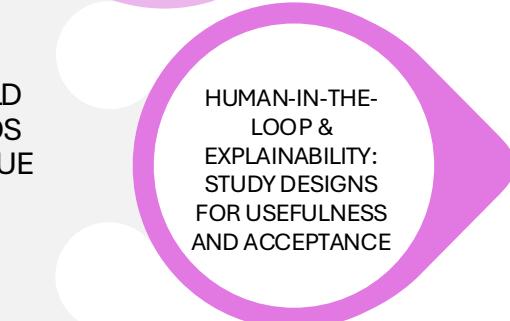
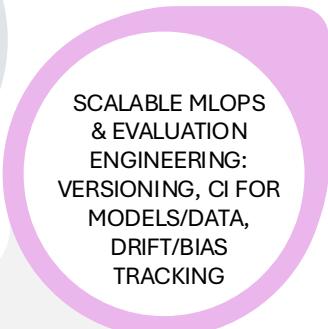
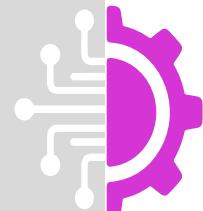
$$y^* = \phi((\omega, x) + \beta)$$

ASSURANCE-READY ML (DOMAIN-AGNOSTIC), QUANTIFIED UNCERTAINTY & CALIBRATION, ROBUSTNESS TO SHIFT/OOD, FAIRNESS & SAFETY, HUMAN-INTERPRETABLE EXPLANATIONS, CONTINUOUS EVALUATION WITH HOOKS TO THE AI ACT AND ISO/IEC

DATA-CENTRIC & KNOWLEDGE-INFORMED LEARNING, DATA QUALITY AND GOVERNANCE, PRIVACY/FEDERATED PIPELINES, DOMAIN PRIORS AND CAUSAL STRUCTURE → BETTER GENERALIZATION AND REAL-WORLD PERFORMANCE

# CROSS-DOMAIN SCIENTIFIC

## CAPABILITIES



**ACUBE RESEARCH IS TRANSVERSAL** - WE BUILD TRANSFERABLE METHODS THAT ADD SCIENTIFIC VALUE ACROSS KNOWLEDGE DOMAINS.

## A3 METHODS

& NOVELTY



UNCERTAINTY AND CALIBRATION (INCL. CONFORMAL PREDICTION) WITH PER-CASE GUARANTEES

CERTIFIED UNCERTAINTY & CALIBRATION

» GEOMETRIC FOUNDATIONS FOR CROSS-MODAL CONSISTENCY

» CAUSAL REASONING FOR ACTIONABLE EXPLANATIONS

GEOMETRY AND OPTIMAL TRANSPORT; GRAPH/SHEAF CONSTRAINTS FOR CROSS-MODAL CONSISTENCY

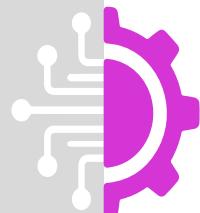
CAUSAL MODELING AND COUNTERFACTUALS, EFFECT ESTIMATION

» PRIVACY-PRESERVING FEDERATED LEARNING

FEDERATED & PRIVACY-PRESERVING LEARNING ACROSS SITES

# DATA INFRASTRUCTURE

## AND SECURITY



WE OPERATE ON A **DOMAIN-AGNOSTIC, COMPLIANT, AND SCALABLE BACKBONE** THAT TURNS RESEARCH INTO **AUDITABLE, PRODUCTION-READY SYSTEMS**—COVERING COMPUTE, DATA GOVERNANCE, AND END-TO-END MLOPS

CLOUD/HPC-READY TRAINING

DATA GOVERNANCE

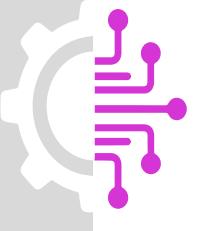
MLOPS

FEDERATED ORCHESTRATION WITH AUDIT TRAILS

DMPS, LINEAGE, ACCESS POLICIES; PSEUDONYMIZATION PIPELINES

VERSIONED DATASETS/MODELS, CONTINUOUS EVALUATION, DRIFT/BIAS MONITORING

# BENEFITS



## ADVANTAGES



- STRONGER HORIZON PROPOSALS**  
SHARPER ALIGNMENT TO EU PRIORITIES, STANDARDS, AND IMPACT
- RESEARCH YOU CAN TRUST**  
METHODS WITH MEASURABLE RELIABILITY (CALIBRATION, ROBUSTNESS, FAIRNESS)
- FASTER PROOF CYCLES**  
REUSABLE PIPELINES PLUS CLOUD/HPC AND FEDERATED SETUPS TO COMPRESS TIME FROM IDEA TO POP
- ASSURANCE & COMPLIANCE BY DESIGN**  
RISK MANAGEMENT ALIGNED WITH AI ACT/ISO/IEC, FULL AUDIT TRAILS AND GOVERNANCE
- REPRODUCIBILITY & OPEN SCIENCE**  
BENCHMARKS, MODEL/DATA/RISK CARDS, AND OSS TOOLKITS FOR TRANSPARENT, VERIFIABLE RESULTS
- SEAMLESS INTEGRATION & INTEROPERABILITY**  
STANDARDS-FIRST (SCHEMAS/APIS), PRODUCTION-GRADE MLOPS, AND CLEAN HAND-OFF TO PARTNERS
- PATH TO IMPACT & EXPLOITATION**  
IPR STRATEGY, CONTRIBUTIONS TO STANDARDS, AND A CLEAR ROUTE TO TRANSITION/TECHNOLOGY TRANSFER

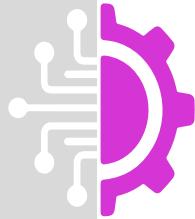
# SCIENTIFIC



## PARTNERS

UNIVERSITY OF PADUA – FACULTY OF MEDICINE AND SURGERY (IT)  
STEMWISE DOO ZA USLUGE (HR)  
FONDAZIONE ISTITUTO ITALIANO DI TECNOLOGIA (IT)  
EUC INOVACAO PORTUGAL UNIPESSOAL LDA (PT)  
MINISTRY OF HEALTH OF THE REPUBLIC OF TURKEY (TK)  
ARISTOTELIO PANEPISTIMIO THESSALONIKIS (GR)  
UNIVERSITY MEDICAL CENTER MARIBOR (SL)  
NATIONAL TECHNICAL UNIVERSITY OF UKRAINE IGOR SIKO (UA)  
UZHGORODSKYI NACIONALNYI UNIVERSITET (UA)  
ALBANIAN INSTITUTE OF TECHNOLOGY (AL)  
FUNDACIO INSTITUT D'INVESTIGACIO BIOMEDICA DE GIRONA (SP)  
STATE INSTITUTION RESEARCH CENTER FOR RADIATION MUA (UA)  
STICHTING VU (NL)  
COÖPERATIE 4LIFESUPPORT EUROPA U.A. (NL)  
ALPHA CONSULTANTS S.R.L. (IT)  
EXEVA S.R.L. (IT)  
SCARECROW INTELLIGENCE LTD. (UK)  
INSTITUTE OF PLANT PROTECTION OF NATIONAL ACADEMY OF  
AGRARIAN SCIENCES OF UKRAINE (UA)  
BULDURU TEHNIKUMS SIA (LT)  
UBOTICA TECHNOLOGIES LIMITED (IR)  
PERIOPSIS LTD (CY)  
NURENDA TECHNOLOGIES LIMITED (IR)  
BURSA ULUDAG UNIVERSITESI (TK)  
HELLENIC MEDITERRANEAN UNIVERSITY (GR)  
METAMETA RESEARCH BV (NL)  
TECHNISCHE HOCHSCHULE NÜRNBERG „G. S. OHM“ (DE)  
AVILOO BATTERY DIAGNOSTICS GMBH (AT)  
BAVARIAN RESEARCH ALLIANCE GMBH (DE)  
IDENER RESEARCH & DEVELOPMENT AIE (ES)  
KUNGLIGA TEKNISKA HOEGSKOLAN (SE)  
RESEARCH INSTITUTES OF SWEDEN AB (SE)  
TÜV SÜD BATTERY TESTING GMBH (DE)  
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## CONTACTS



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