

Photonics is a key enabling technology for next-generation communications, computing and sensing systems.

At gradient we develop photonic solutions that add functionality and enhance performance while minimizing SWaP for demanding operational environments.



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Photonics

Technology with real impact

by gradient 

Two innovation layers

Enabling Integration

Near-term, scalable, system-ready innovation:

- ✓ Boost performance, reduce footprint and power consumption for performance and efficiency scaling.
- ✓ Enable low latency, high bandwidth operation through hybrid electronic-photonic solutions based on RF photonics co-integration
- ✓ Deliver ultrafast broadband analog photonic processing for wideband communication and sensing applications

Transformative frontiers

Long-term, paradigm shifting innovation:

- ✓ Advance neuromorphic photonics and photonic AI inference for extreme speed and unprecedented energy efficiency
- ✓ Develop energy autonomous photonic solutions based on integrated energy harvesting for near-zero operation
- ✓ Realize simultaneous communication and sensing through photonic based perception-aware connectivity
- ✓ Enable miniaturization of advanced photonic sensors with embedded intelligence and autonomy

Communications

Applications

- ✓ Advanced front-end architectures for telecom, aerospace and defense
- ✓ Spectrum monitoring and signal intelligence
- ✓ In-band full duplex communication systems
- ✓ Integrated communication, sensing, radar platforms.
- ✓ Hybrid electronic/photonic communication submodules

Computation

Applications

- ✓ Low latency edge AI processing for SWaP constrained environments.
- ✓ Real-time data processing for mission-critical systems.
- ✓ Photonic neuromorphic computing for low consumption AI inference.
- ✓ Near-zero-power operation for autonomous and long-lifetime systems

Sensing

Applications

- ✓ Precision sensing in complex and harsh environments.
- ✓ Multi-functional sensing platforms for situational awareness
- ✓ Compact sensing systems for space and embedded deployment.
- ✓ Autonomous sensing for long-term and unattended operation

Gradient in the Photonics value chain

Our capabilities span the complete development life-cycle of photonic solutions, encompassing signal-processing algorithm development, component-, chip-, and system-level design and modeling, packaging, demonstrator assembly, and experimental laboratory validation.

