

*Scaling new heights in photonics*



# Technology Clusters

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Workshop on Climate Friendly Technologies

Cleveland, Ohio

[www.coloradophotonics.org](http://www.coloradophotonics.org)

# Outline

- What is a cluster?
- High-tech clusters
- Cluster formation
- Colorado Photonics Industry Association experience

# What is a cluster?

- Porter: “critical masses in one place of unusual competitive success in particular fields”
- Geographic concentrations of similar, related or complementary businesses and institutions with active channels for business transactions, communications and dialogue, that share specialized infrastructure, labor markets and services, and are faced with common opportunities and threats.

# High-tech clusters

- Innovation
- *Entrepreneurial culture*
- Technological change
- Skilled labor force
- Proximity to sources of knowledge and expertise
- Technology spill-over
- Availability of capital
- IP protection
- Tax-based incentives for innovation

# Photonics Clusters

- Photonics:
  - Broad term for optical technologies
  - Enabling technology across many industries
  - Lack of recognition as an industry
  - Companies identify themselves as aerospace, medical devices, etc.

See [www.photonicsclusters.org](http://www.photonicsclusters.org) for a list of worldwide photonics clusters

# Cluster Formation

1. Inert region, but with some resources: universities, government labs, large companies, but no significant entrepreneurial activity.
2. Some change - policy, economics - stimulates entrepreneurship; development of infrastructure (private or public initiatives) to support the industrial activity
3. Critical mass of resources, cluster forms - informal first, then formal, if needed

# Informal Clusters

- Complex, self-organizing process
- Strong industry-university collaboration
- Beyond critical mass
- Interaction happens naturally, no need for formal events

# Formal Clusters

- University - usually tech transfer
- Industry - small to medium size companies are the drivers and beneficiary
- Economic development agencies
- Geographical proximity - 1.5 hrs drive
- Champion - company, government, individual

Very often:

- National labs
- Service providers

# Usual Activities/Benefits

- Networking
- Trade Shows
- Workforce Development
- Newsletter
- Legislative action
- Meetings, lectures, workshops
- Directory
- Website with links to members
- Marketing/PR
- Job openings/resume board
- Discounts from members

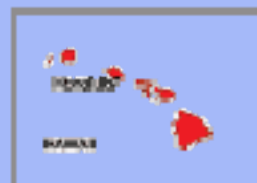
# Financing Sources

- Membership dues
- Fund raising
- Government
- Special projects
- Legislative earmarks

# Challenges

- Sustained Funding
- Cooperation vs. competition
- Administrative Support
- Volunteer-based vs. executive director
- How do you measure success?

# United States



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# Europe



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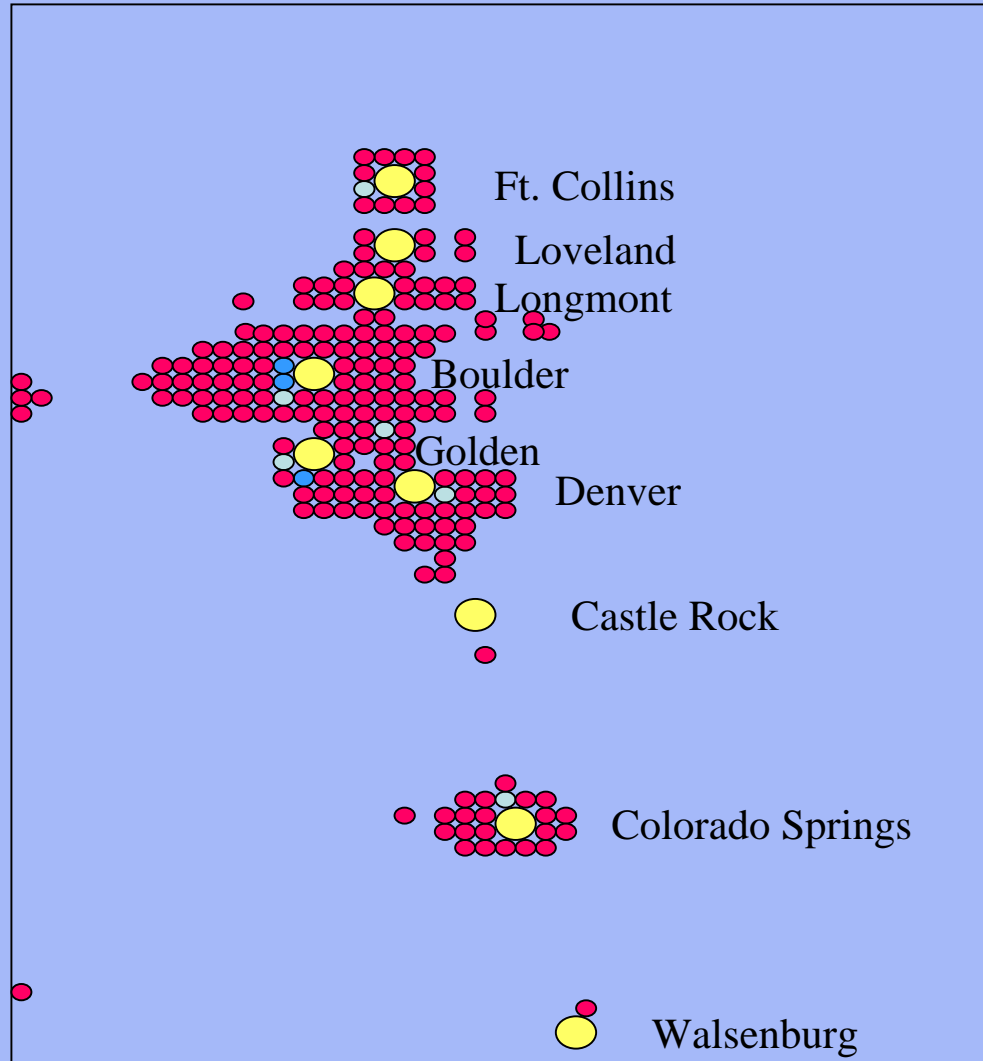
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# European Clusters

- Government driven
- EU projects
- Some full-time staff
- Umbrella organization: European Photonics Industry Consortium
  - [www.epic-assoc.com](http://www.epic-assoc.com)

# Colorado Photonics Industry Association



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# Colorado Photonics Industry Association

- Formed in 1997, in response to workforce development needs of the industry
- Colorado Advanced Photonics Technologies Center (CAPT)
- Photonics Technician program at Front Range Community College

# Colorado Photonics Industry Association in 2004

- 260 organizations
  - 206 companies (136 manufacturers)
  - 4 universities (60 professors)
    - University of Colorado - Boulder
    - Colorado State University - Fort Collins
    - Colorado School of Mines - Golden
    - University of Denver
  - 4 national labs
    - National Institute of Standards (NIST)
    - National Oceanic and Atmospheric Administration (NOAA)
    - National Center for Atmospheric Research (NCAR)
    - National Renewable Energy Laboratory (NREL)
  - 44 support organizations

# Member Benefits

- Networking and information opportunities
- Raised visibility of members and CO photonics
- Championed photonics needs in the federal legislation
- Discounts for members
- Facilitated interaction between companies and service providers
- Sound financials
- Photonics Community Development
- Expanded CPIA's capabilities by joining the ACC as an affiliate member

# Advanced Colorado Center (ACC)

- State-funded incubator for non-profit organizations associated with growing sectors of interest for Colorado
- 3 year infrastructure support
- Grant possibilities

# References

- SSTI: technology-based economic development <http://www.ssti.org/>
- Milken Institute  
<http://www.milkeninstitute.org/>
- Maryann P. Feldman  
<http://www.rotman.utoronto.ca/feldman/>

# Conclusion

- Work locally to compete globally

# Questions?

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