

EVENTO DE NETWORKING

HEALTHCARE & PHOTONICS

TECNOLOGIAS FOTÓNICAS APLICADAS AL SECTOR HEALTHCARE

26 MARZO/14

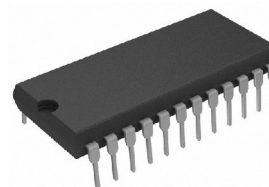
09.45h-17.00h
Parc Audiovisual
de Catalunya
Carretera BV-1274,
Km.1, 08225 Terrassa
(Barcelona)



VLC
PHOTONICS

Aplicaciones de la
optica integrada
para dispositivos
de diagnostico y
lab-on-a-chip

Agregar varios componentes de un sistema en un unico chip monolitico:

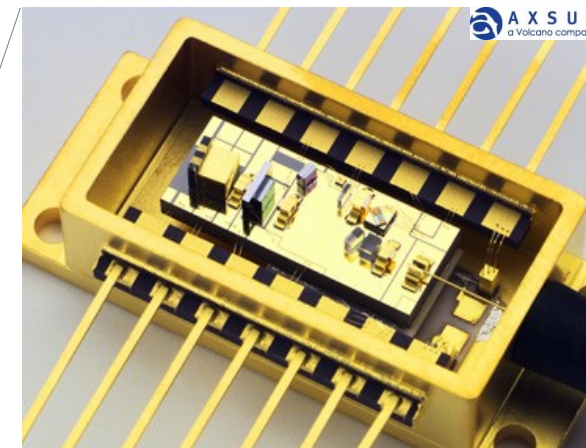


Transistores
Condensadores
Resistencias
Bobinas
etc.

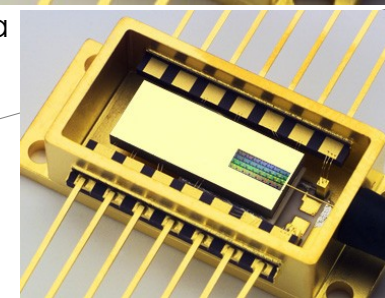
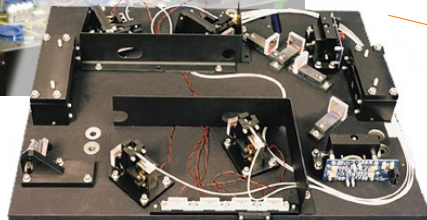
Misma evolucion que la electronica:



Laseres
Diodos LED
Fotodetectores
Filtros opticos
Acopladores
Divisores
Interferometros
etc.



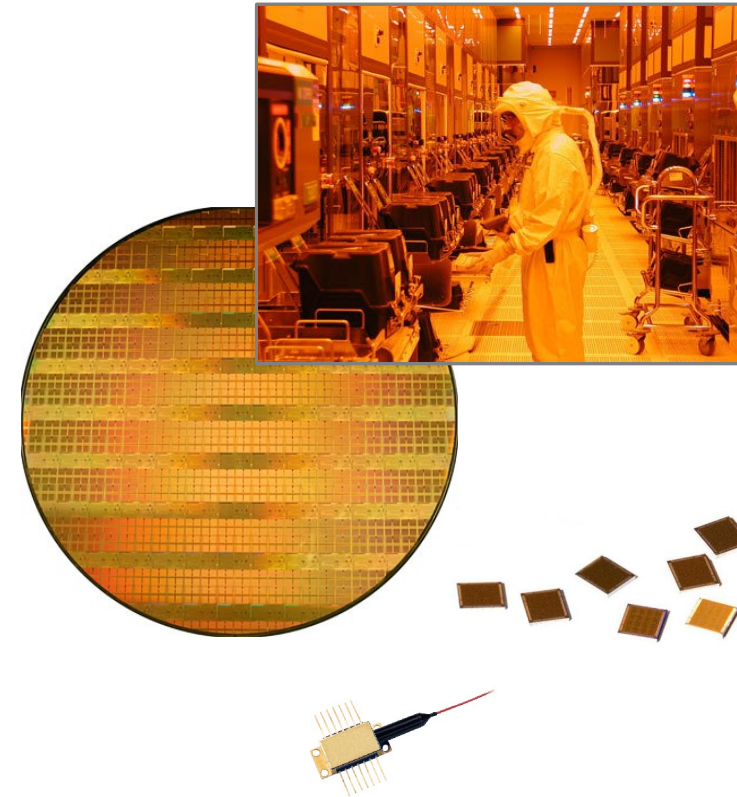
Micro-optica



Optica integrada

Ventajas de la integracion en chip:

- Reducir el tamaño y peso
- Portable, desechable
- Simplificar el ensamblado y encapsulado
- Mejorar la estabilidad y robustez
- Aumentar la complejidad
- Mayores volúmenes de producción
- Reducción de costes



Concepto de
dispositivo o
sistema optico



Diseño
de chip
fotonico



Fabricacion
y encapsulado
externos

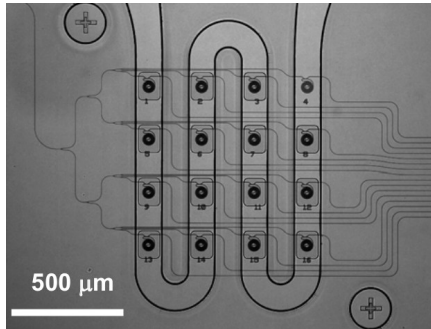
Sensores biofotonicos y lab-on-a-chip

- Macromoleculas biologicas (proteinas, acidos nucleicos, otras macro-moleculas), molecules pequenas (quimicos), y nano-particulas o virus
- Identificacion de patogenos mediante filtrado en masa
- Identificacion y respuesta rapida a incidentes
- Monitorizacion frecuente y periodica

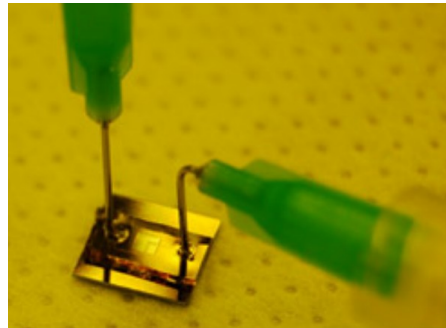
Table 1: **Classification of biomedical sensors by type showing various biomedical parameters of interest**

Physical	Chemical	Biological
Body temperature	pH	Antigens
Blood pressure	pO ₂	Antibodies
Blood flow	PCO ₂	Electrolytes
Heart rate	Oximetry (SaO ₂ , SvO ₂)	Enzymes
Force	Glucose	Inhibitors
Position	Bile	Metabolites
Respiration	Lipids	Proteins

LASERFOCUSWORLD



Cortesía NRC 2011

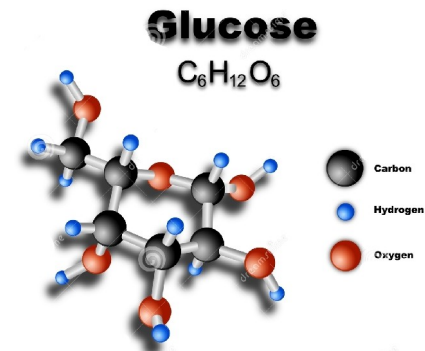


Cortesía Univ. Iceland 2012

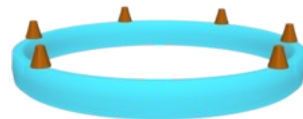
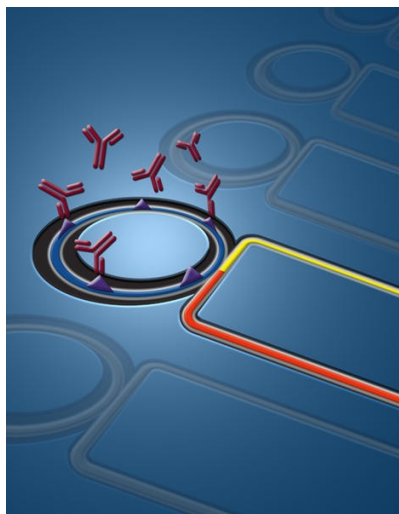


GlucoSens

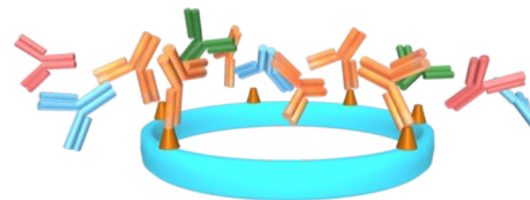
- Desarrollo de tecnologias para la monitorizacion continua de glucosa usando sensores opticos implantables.
- Sensores en chip basados en microespectrometros, habilitando analisis espectral in vivo de tejidos biologicos.



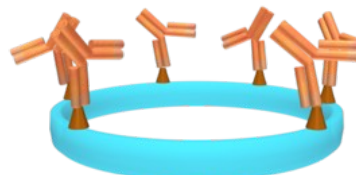
 **Genalyte**



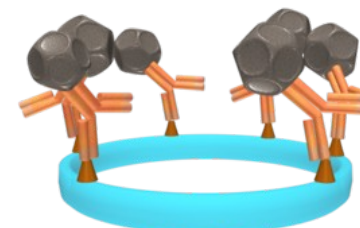
1. Microring sensor functionalized with autoantigen



2. Serum, plasma or whole blood flows over autoantigens



3. Autoantibodies specific for autoantigen bind



4. Signal is amplified and microring sensor is interrogated by Maverick software



1. Load undiluted sample into reagent plate.



2. Pipette to mix.



3. Insert preloaded reagent plate and chip array into instrument.



4. Press Start. The remainder of assay run is fully automated.

Sensores en fibra optica:

- Medicion de temperatura, presion, PH, flujo, etc.
- Multiples medidas en serie o en paralelo
- Sensores diminutos e interrogadores de alta precision

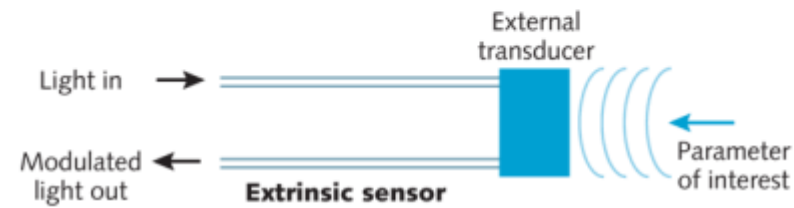
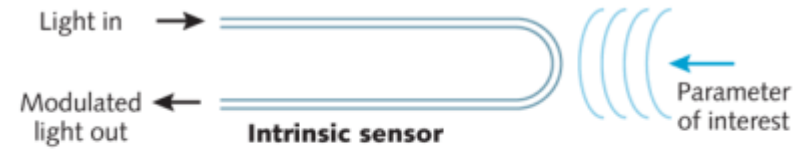
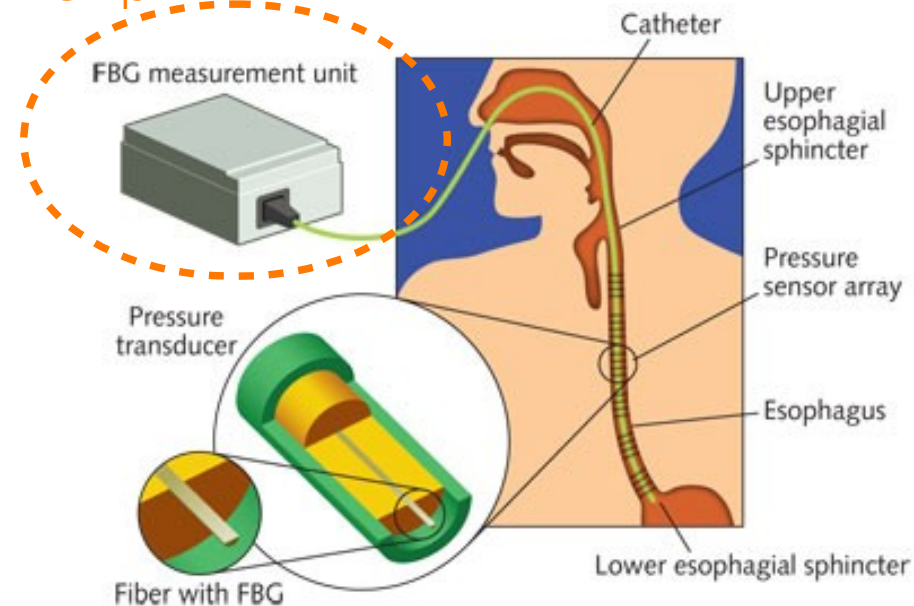


Table 2: **Examples of commercial fiber-optic biomedical sensors by type**

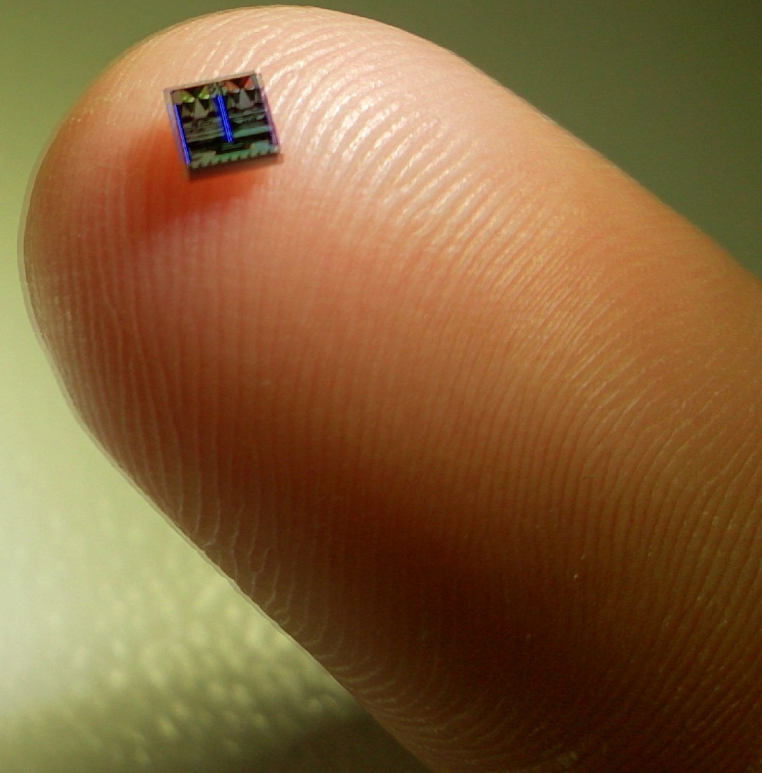
Parameter	Company
Temperature	Fiso, LumaSense, Neoptix, OpSens, RJC
Pressure	Fiso, Maquet, OpSens, Samba Sensors, RJC
Coronary imaging	InfraRedx
Oxygenation	ISS
Pulse oximeter	Nonin
Blood flowmeter	ADInstruments
Shape/position	Hansen Medical, Intuitive Surgical, Luna, Measurand, Technobis
Force	EndoSense
EKG/EEG	Srico

En chip



Thank you for your attention

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www.vlcphotonics.com



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