



Global**Exposome**

Compassionate Science, Sustainable Planet

Luis Falcón, MD, MSc

About me



Luis Falcón

Founder, GNU Solidario
Author of GNU Health
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Education

- Computer Scientist
- Physician
- Genomics & Medical Genetics

Activism

- Social Medicine
- Animal Rights

Advancing Social Medicine



- GNU Solidario is a non-for-profit organization
- Works globally
- Focused on Social Medicine
- Fights for the rights of human and nonhuman animals
- NPO behind GNU Health and Global Exposome Project

GNU Solidario around the world



Projects from GNU Solidario



GNUHealth: The Libre Digital Health Ecosystem

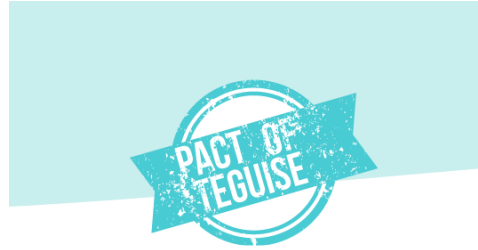


Rompiendo Cadenas



FREE BEAGLES
FROM EXPERIMENTS

Free beagles from experiments at University of Barcelona, and replace them by ethical, human-relevant methods



PACT OF TEGUISE
NO MORE ANIMAL ABUSE



A call to accelerate human-focussed medical research

Exposome/ ('ɛkspəʊ,səʊm) /

“The **cumulative** measure of **environmental** influences and associated **biological responses** throughout the lifespan, including exposures from the environment, diet, behavior, and endogenous processes.”

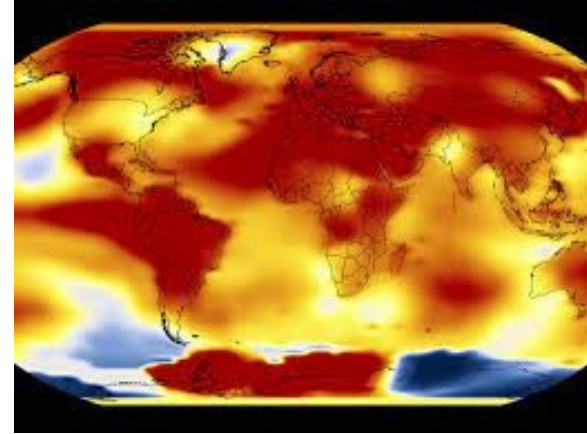
Miller and Jones (2014)

Humanity cause and victim of a global chronic inflammation



- Anthropocentrism
- Capitalism
- Speciesism
- Abuse of natural resources
- Social gradient & inequity

Anthropogenic disaster by a few powerful greedy, myopic psychopaths



Corporate influence in Europe Decision Making



gmfreeme.org

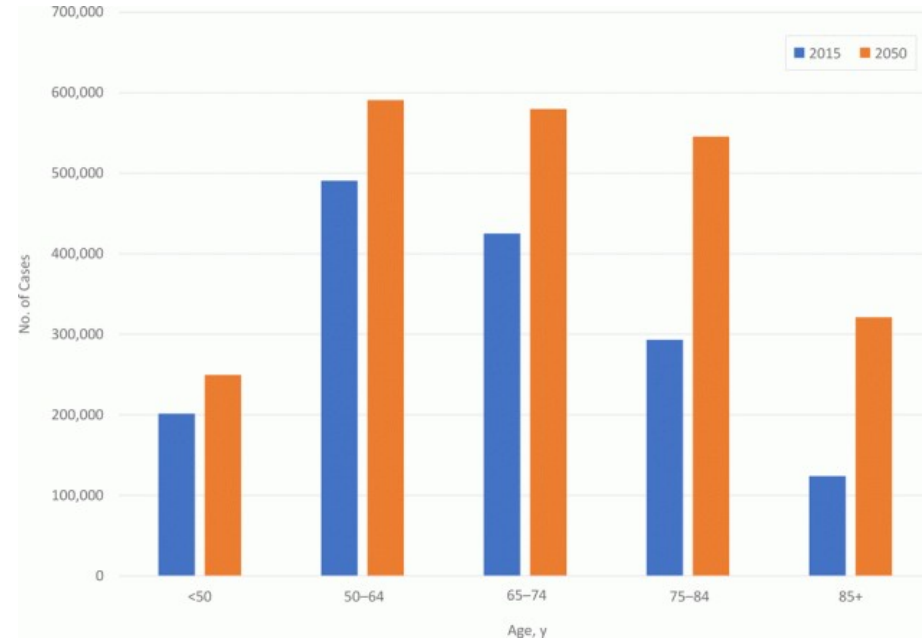
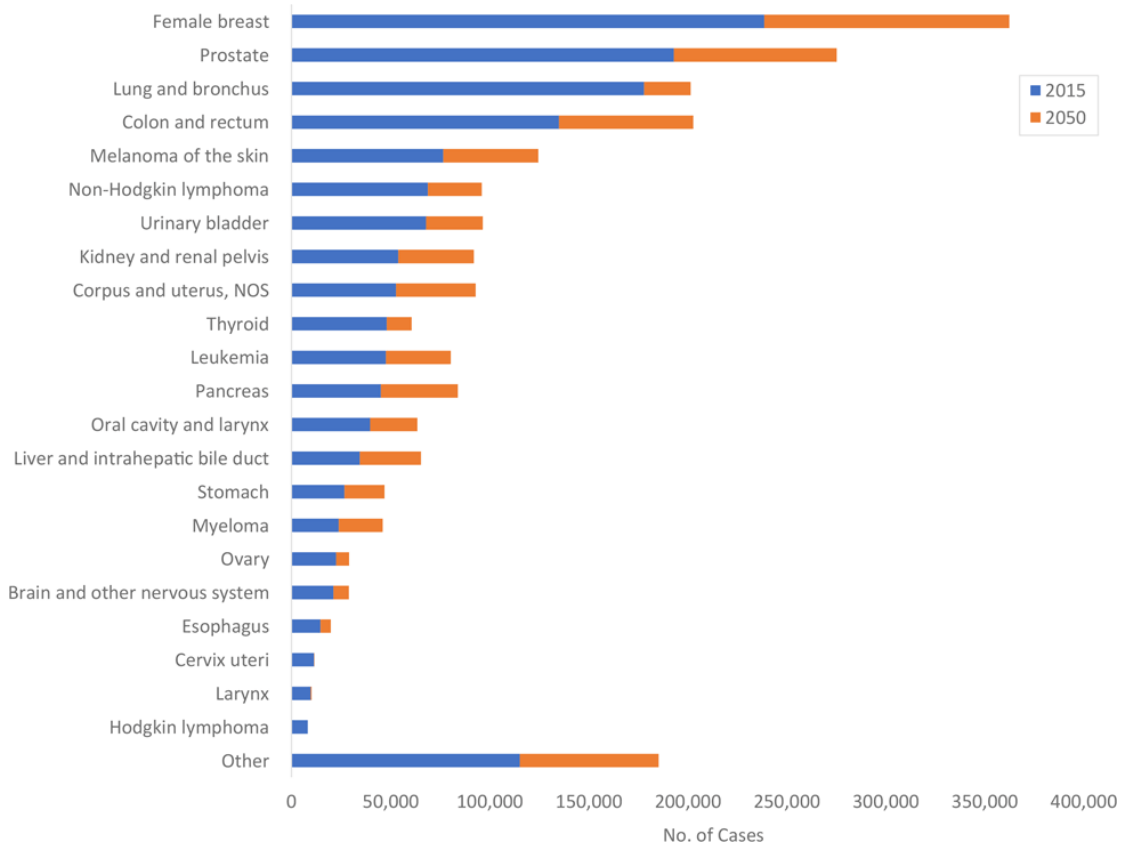
2023: Despite the facts EU keeps extending the use of glyphosate

Monsanto fined \$289 million for failing to warn users of glyphosate-cancer link

In the first of many pending trials in the US, a California jury has ruled that the herbicide glyphosate (Roundup) can cause cancer.

- CYP450 inhibitor
- Cancer
- Dysbiosis / microbiome unbalance
- Autism

Cancer incidence on the rise (in all age groups)



Source: CDC

Nature and Nurture: The underprivileged always more vulnerable



Tuberculosis: Paradigm of Social disease
1/3 of the global population is infected. Who gets sick?



HUB

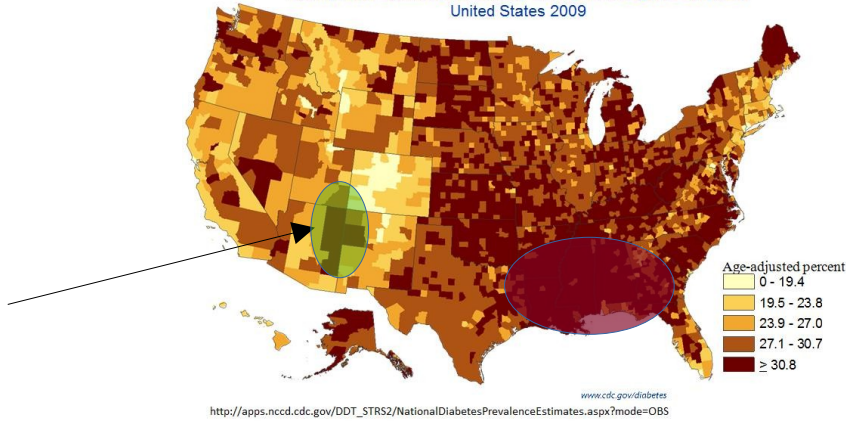
JOHNS HOPKINS
UNIVERSITY

New data shows COVID-19's disproportionate impact on American Indian, Alaska Native tribes

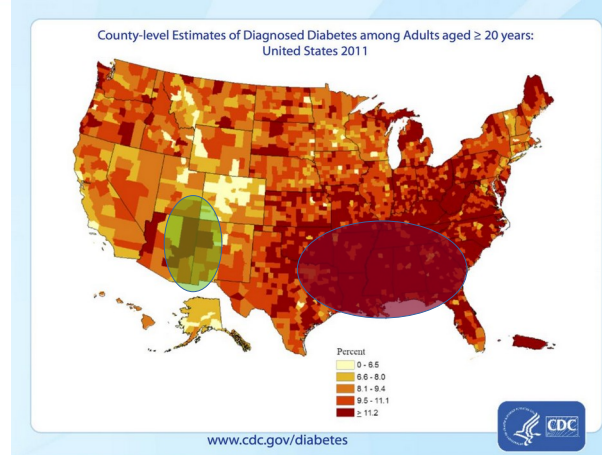
Johns Hopkins Coronavirus Resource Center, Center for American Indian Health launch visualization of pandemic spread within Tribal Nations

Nature and Nurture: Map of obesity, diabetes, heart disease and poverty in the US

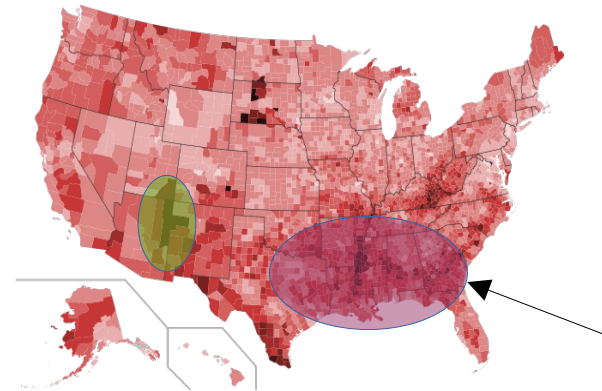
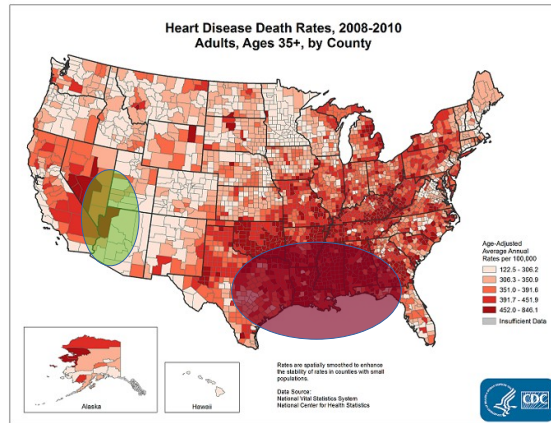
County-level Estimates of Obesity among Adults aged ≥ 20 years:
United States 2009



County-level Estimates of Diagnosed Diabetes among Adults aged ≥ 20 years:
United States 2011



Heart Disease Death Rates, 2008-2010
Adults, Ages 35+, by County



Nature and Nurture: 20000+ children die daily victims of Social diseases



- Human Trafficking
- Contaminated Water
- Malnutrition
- Cholera
- Drug abuse
- Prostitution
- Chagas
- Tuberculosis
- Child Labour
- War
- Family Violence
- Malaria
- HIV /AIDS

Animal experimentation: A cruel business lost in translation



Kidnapping, hurting and killing sentient beings is not science

- “*Humans are not 70-kg mice*” (Leist, Hartung)
- Over 96% trials result in failure
- ≈100% failure in neurodegenerative conditions
- Lost in translation from preclinical animal trials to human.
- 3Rs (Replace, Reduce, Refine) has failed

See : <https://www.gnusolidario.org/animalrights/petition-free-beagles.html>

Link between Animal Cruelty and Violence against women



Spain sets record of animal cruelty and violence against women



VIOLENCIA MACHISTA >

Un comienzo de año trágico con cuatro mujeres asesinadas en un día dispara las alarmas de la violencia machista

Tras un diciembre con cifras récord, enero arranca con una jornada negra que provoca concentraciones en diversas localidades y llamadas a renovar el pacto de Estado

elpais.com

Compassionate Science, Sustainable Planet

Respect

Mother nature, animals
(human and non-human)



Education

People, patients, health prof,
Politicians...

Research

Medicine, exposomics,
Agriculture,
Social sciences,
urbanism...

GlobalExposome

Compassionate Science, Sustainable Planet

Collaboration

Open Science, Free Software,
Local capacity building

Respect: *“First, do no harm”*

Primum non nocere

Respect

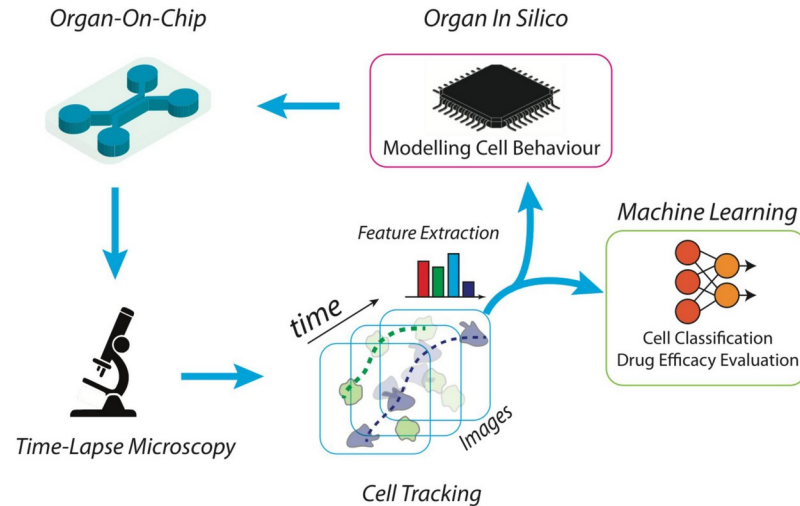
Mother nature, animals
(human and non-human)



We use ethical, human relevant alternatives to animal experimentation

Respect

Support cruelty-free, human relevant research



From Petri Dishes to Organ on Chip Platform: The Increasing Importance of Machine Learning and Image Analysis
<https://www.frontiersin.org/articles/10.3389/fphar.2019.00100/full>

NAMs

- New Approach Methodologies
- Human relevant
- Ethical
- Affordable
- Dynamic
- Specific to individual / context

Education and reaching out

Education



First GNU Solidario project. Santiago del Estero, Argentina 2006

Education: Working with academic & research institutions

HST.936: Global Health Informatics to Improve Quality of Care

The 2015 iteration of our course will focus on **Public Health Emergencies and Humanitarian Crises**.

Classes begin: February 6, 2015
Fridays 9am - 11am ET (GMT -5)
Room: 09-057



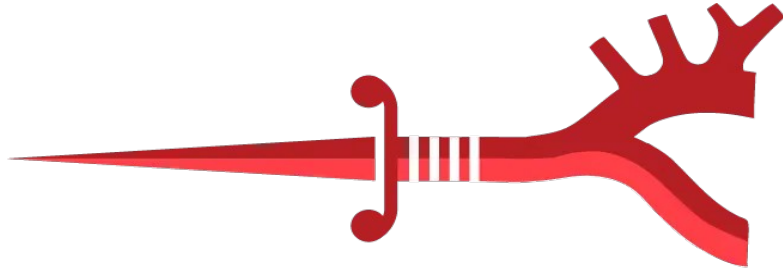
GNUHealth
ALLIANCE
OF ACADEMIC AND RESEARCH INSTITUTIONS



Research: The Stiletto Project

A Computational Model of the Cerebral Perforating Arteries in Health and Disease

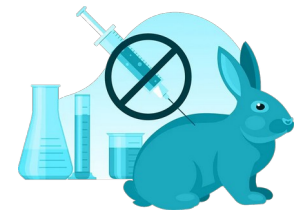
Research



STILETTO

A computational model of the cerebral perforating arteries in health and disease

- Role of exposome in Small Vessel Disease, cognitive impairment & dementia
- Multi-disciplinary project
- Tiny cerebral arteries (μm) critical in cerebral homeostasis
- Brain microcirculation and the neurovascular unit (NVU)
- Cruelty-free research (no animal models)
- Open Science for education and research



Data collection and aggregation from institutions and individuals

Research

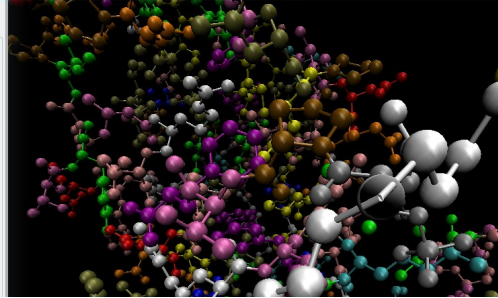
GNU Health - admin@localhost/genetics - Administrator - GNU SOLIDARIO HTAL (Euro)

Variant Phenotypes 17 / 40

Variant Phenotypes

Gene & Protein	Variant	Phenotype
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007778 : p.Trh1025Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007781 : p.Val1047Ala	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007782 : p.Pro1150Ser	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007796 : p.Ala1708Glu	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007799 : p.Met1775Arg	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020683 : p.Asp749Tyr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020692 : p.Arg1204Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020693 : p.Lys1207Asn	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_063212 : p.Met1775Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-02602:Breast cancer
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_020896 : p.Pro47Ala	DI-02602:Breast cancer
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_020900 : p.Met299Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007757 : p.Cys61Gly	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020702 : p.Cys1697Arg	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020696 : p.Phe1226Leu	DI-01559:Breast-ovarian ca
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020697 : p.Arg1243Gly	DI-01559:Breast-ovarian ca
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023700 : p.Gln255His	DI-01603:Fanconi anemia c
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023702 : p.Ala349Pro	DI-01603:Fanconi anemia c
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023703 : p.Trp647Cys	DI-01603:Fanconi anemia c
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023704 : p.Arg707Cys	DI-01603:Fanconi anemia c

Connected



MyGNUHealth 2.0rc1

HOME Menu

Date 26 9 2023 Time 12 35

Genotyping test

Domain & Context **medical** genetics

rs397508635	CFTR	P13569
p.Ser13Phe	VAR_000101	LP/P

Cystic fibrosis (CF) [MIM:219700]

specific natural variant information by entering the reference seq ID . Once it finds a match on the information is automatically shown. Some of the information shown contains the gene symbol, acid change, natural variant ID, the category (likely benign or pathogenic) and the MIM identifier.

Relevance **important** Private page:

Save

MyGNUHealth 2.0rc1

HOME Menu

Personal key


Sign in

MyGNUHealth

The GNU Health Personal Health Record

Collaboration: GNUHealth Federation

Collaboration

A world map with a network of white lines connecting various geographical locations. Each connection point is marked with a small white circle, and some points have concentric circles around them, suggesting hubs or active nodes in the network.

Information gathered from participating institutions across the globe. Statistics, validation,...

Open Science: Researchers and Scientists and from around the world will be able to participate

Improve quality of care

From Medical imaging, laboratory and **genomics** to **Socioeconomic and lifestyle** information

The **person** is an active player in the system of health

Using GPL license saves millions of euros and boosts collaboration for the betterment of our health systems.

GNU Solidario around the world

Collaboration

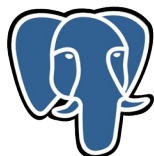
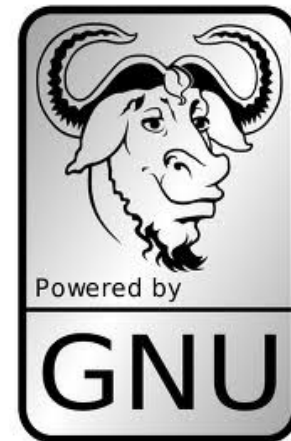
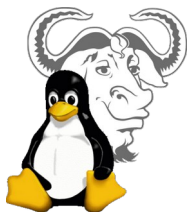


Collaboration: Building local capacity and autonomous communities



Collaborating through Open Science & Free Software

Collaboration



PostgreSQL



Public Administration adoption

Collaboration



Thank you!



<https://www.gnusolidario.org>