



# Global report 2014 · 2020

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Research

Publications

[info@breathinggames.net](mailto:info@breathinggames.net) | [www.breathinggames.net](http://www.breathinggames.net)

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COMMUNICATION ON  
PROGRESS

This is our **Communication on Progress**  
in implementing the principles of the  
**United Nations Global Compact** and  
supporting broader UN goals.

We welcome feedback on its contents.

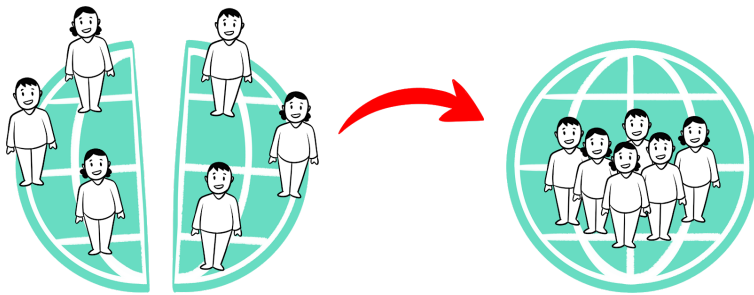
## In a nutshell

Ensuring that every human can afford a decent and healthy life is an individual duty.

It can be easily achieved if we mutualize resources to create knowledge and technologies that can be freely used, reproduced, adapted, improved.

### Aiming co-created collective health

Play is a natural way to experiment, socialize, learn. Our community invites people to collectively create libre and open-source games and game controllers to foster mutual and self-care in respiratory and mental health.



We bring together game designers, programmers, artists, people with respiratory and mental health experience, clinicians, and other passionate people. Together, we prototype games, develop an inclusive creation and research methodology, and mutualize resources to coordinate the initiative and root it local communities.

### Valuing access to care

- We create essential solutions with diverse communities who need them.
- We mutualize forces and collaborate meaningfully to avoid alike projects.
- We ensure our work can be reproduced + improved freely by individuals.
- We ensure that outcomes generated are shared among the contributors.
- We validate accessibility and health outcomes with scientific methods.

### Facts and figures

- 350 professionals and researchers mobilized across five countries
- 440000 viewers reached through broadcast and documentary
- 20000 hours of contributions
- 53 scientific communications
- 15 media interviews including the documentary A new Economy
- 300 K research funds and donations received
- 22 co-creation events organized
- 22 games prototyped
- 6 game controllers prototyped

### Key affiliations

We are members of the

- Global Alliance against chronic Respiratory Diseases (GARD-WHO)  
a network of over eighty lung associations to reduce the burden of respiratory diseases, especially in poor regions.
- Open Source Initiative  
a network of over eighty organizations advocating for open-source
- International Geneva Welcome Center  
a support center for international civil servants and non-governmental organizations based in Geneva.

# Principles

Since May 2016, Breathing Games is a signatory of the UN Global Compact. We celebrate human life and the right to do meaningful activities. The first article of the Declaration of Human Rights leads our vision:

*All human beings are born free and equal in dignity and rights.  
They are endowed with reason and conscience and should act  
towards one another in a spirit of brotherhood.*

We understand collectively created health knowledge and technologies as the way to promote self- and mutual care. To “ensure healthy lives and promote well-being for all at all ages” (UN Global Goal 3), we believe that all should become creators of the collective wellbeing, putting in commons our experience, and ideas.

We encourage individuals and peer-to-peer communities to build on our work through following principles.

## Free software and open-source hardware

We use tools that respect the users’ freedom to use and share them, and modify their source code and design, when such tools provide the functions we need, and do not require an excessive time to acquire them:

- GitLab for sharing our games and documentation
- GIMP for image edition
- LibreOffice for offline documentation

## Copyfair licences

Instead of an excluding copyright, we use licences that preserve the right to reuse and enrich knowledge and technologies if reciprocity is provided:

- GNU Affero General Public License 3.0 (Free Software Foundation)
- Attribution-ShareAlike 4.0 International (Creative Commons)
- Open Hardware Licence Strong Reciprocal (CERN)
- Peer Production Licence (P2P Foundation)

## Accessible documentation

We document our co-creation process, the source code of software and designs of hardware created, and make this documentation freely accessible via:

- breathinggames.net
- gitlab.com/breathinggames
- full open access publications and repositories like Zenodo
- platforms to reach broad communities like Discord (gamer messaging)

## Participatory research

To reduce power inequalities and encourage social transformation, we do research with the participants rather than on or for them. We consider that not to have a positive impact when being privileged is unethical.

## Open governance and distributed data system

We log contributions in time, money and kind to acknowledge individual efforts towards the collective. This also provides a basis for traceability.

We aim to develop a distributed platform to mutualize and redistribute resources across a global community. This should help individuals find communities, merge ideas, develop global projects, do peer-reviewed quality control, and co-define how data is managed. See chart below.

## Agility









We foster transdisciplinarity. We take advantage of existing infrastructures, use a frugal approach, and develop low-tech products.

Thus, we build a coherent ecosystem: an open access commons increasingly capable of sustaining communities in developing and sharing health knowledge, fostering social justice, reducing inequalities.

Updated July 2020

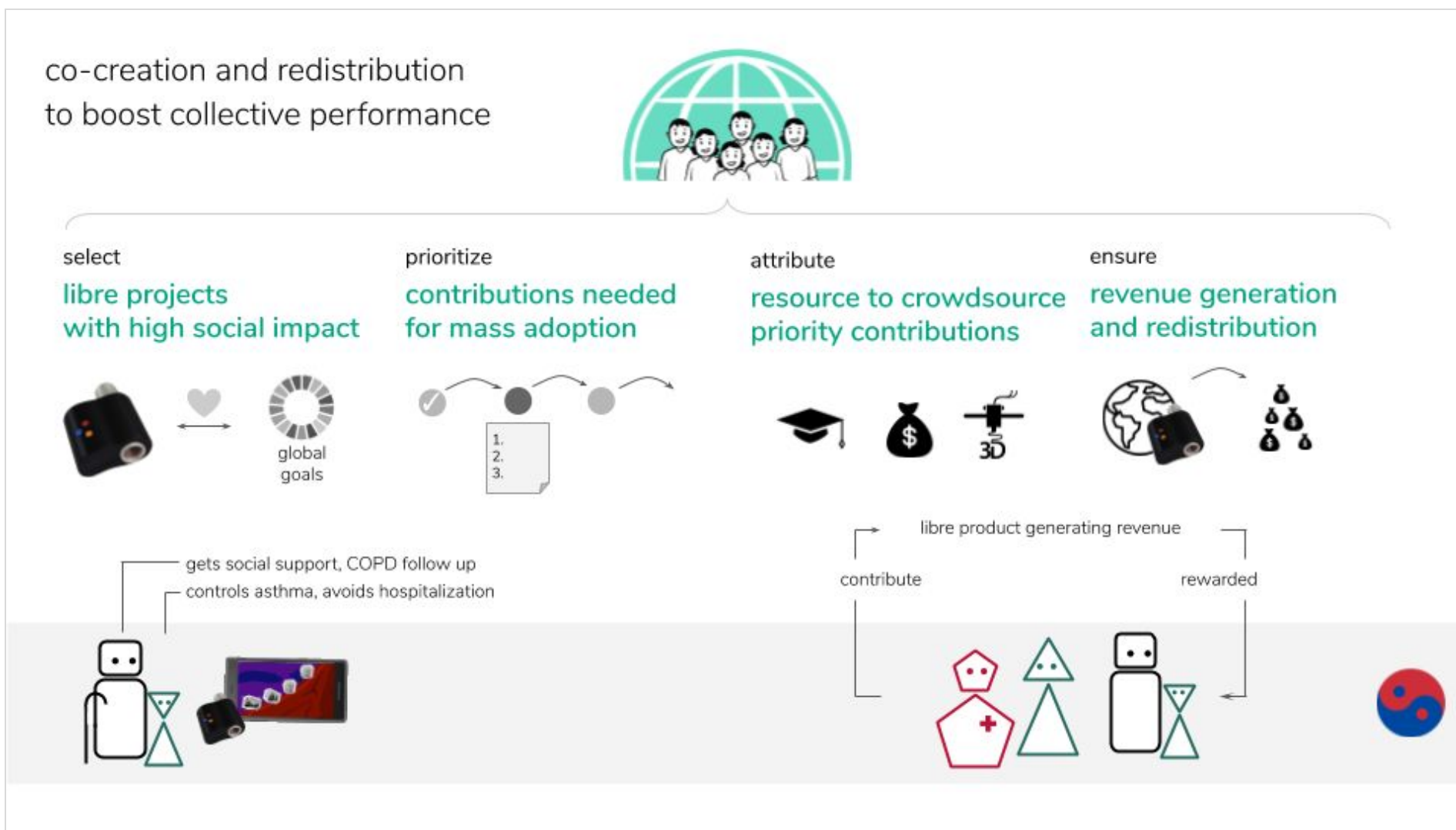
# Global goals

We contribute to the 2030 Agenda for Sustainable Development, adopted by the United Nations.

Goal	Target	Our contribution
 <b>3</b> GOOD HEALTH AND WELL-BEING	Ensure healthy lives and promote well-being for all at all ages  3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air [...].  3.d: Strengthen the capacity of all countries [...] for early warning, risk reduction and management of national and global health risks.	We actively encourage the population to co-design solutions that meet their real needs, hence taking ownership of their health, and health technologies.  We provide members from the Global Alliance against chronic Respiratory Diseases with enjoyable tools that are easy to use, reproduce and adapt in low-resource settings.
 <b>1</b> NO POVERTY	End poverty in all its forms everywhere  1.A: By 2030, ensure that all [...] have equal rights to economic resources, as well as [...] control over [...] appropriate new technology [...].	We provide a scalable, sustainable example of how people across countries, organizations and disciplines can cooperate to develop science-based innovation everyone can enrich.
 <b>4</b> QUALITY EDUCATION	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all  4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development [...].	We ensure free access to educational tools and co-creation methods, and encourage vulnerable populations to develop skills to locally produce cheap and adaptable open hardware.
 <b>8</b> DECENT WORK AND ECONOMIC GROWTH	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all  8.3: Promote [...] policies that support productive activities, [...] creativity and innovation [...].	We foster a fair redistribution of resources among autonomous contributors to a collective project.
 <b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation  9.b: Support domestic technology development, research and innovation in developing countries [...].	We foster mutualized, open-source innovation across countries as a way to reduce redundancies, products unfit to users, and planned obsolescence.
 <b>11</b> SUSTAINABLE CITIES AND COMMUNITIES	Make cities and human settlements inclusive, safe, resilient and sustainable  By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality [...].	We provide gratis and fun educational tools to foster awareness and dialogue about respiratory health and air quality, from childhood and across generations.
 <b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION	Ensure sustainable consumption and production pattern.  By 2030, ensure that people everywhere have the relevant information and awareness for [...] lifestyles in harmony with nature.	We develop a data commons across countries, that is elaborated and managed with the participating communities.
 <b>17</b> PARTNERSHIPS FOR THE GOALS	Strengthen the means of implementation and revitalize the global partnership for sustainable development  Enhance [...] international cooperation on and access to science, technology and innovation and enhance knowledge sharing [...].	We create new mechanisms of cooperation based on participatory research, peer-to-peer production and distributed governance.

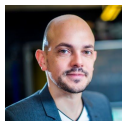
## Organization

One goal for the professionalization of our structure is to adopt an open governance model, and social impact indicators. This will allow us to scale up the initiative while keeping a structure that fosters open cooperation and transparent redistribution. Also read 'coordination' at [coronavirus-openkit.net](https://coronavirus-openkit.net).



# Contributors

## Co-founders



Fabio Balli  
Project lead

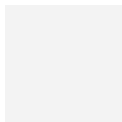


Yannick Gervais  
Lead developer



John Danger  
1st device prototype

## Key contributors



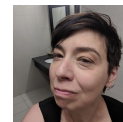
Amy D-Piers  
Graphism  
Switzerland



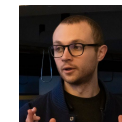
Thomas Gaudy  
Game design  
Canada



Bernard Dugas  
Hardware  
Switzerland



Maria Frangos  
Interface design  
Canada



Damien Fangous  
Game design  
Switzerland



Nicolas Wenk  
Programming  
Switzerland



Charly Pache  
Support  
Switzerland



Collin Gallacher  
Hardware  
Canada



Henry Hurtado  
Support  
Canada



Sze Man Tse  
Medicine  
Canada



Alena Valderrama  
Public health  
Canada



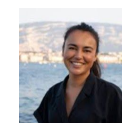
Guillaume Bertrand  
Hardware  
France



Myriam Bransi  
Medicine  
Canada



Tiberius Brastaviceanu  
Hardware  
Canada



Charlotte Broccard  
Graphism  
Switzerland



Pierre Régis Burgel  
Medicine  
France



Marlène Claricia  
Medicine  
France



Éric Comte  
Support  
Switzerland



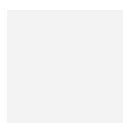
Julia Dallest  
Support  
Switzerland



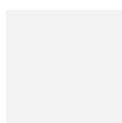
Steve Ding  
Hardware  
Canada



Christophe Dollet  
Support  
France



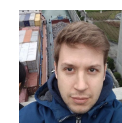
Odile Flez  
Medicine  
France



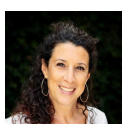
Stéphane Gingras  
Support  
Canada



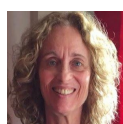
Valentin Gomez  
Public Health  
France



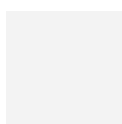
Emmanuel Kellner  
Hardware  
Switzerland



Maya Kirszenbaum  
Psychology  
France



Stefania La Grutta  
Medicine  
Italy



Aline Lustre  
Medicine  
France



Thomas Maillart  
Support  
Switzerland



Romain Martischang  
Support  
Switzerland

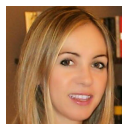




Jelena Milenkovic  
Support  
Switzerland



Youssef Mohammad  
Medicine  
Syria



Laura Montalbano  
Psychology  
Italy



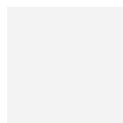
Abir Oreibi  
Support  
Switzerland



Isabelle Sermet  
Medicine  
France



Olivier Testault  
Hardware  
France



Christine Todeschini  
Medicine  
France

## Former key contributors



Jim Anastassion †  
Hardware  
Canada



David Arango  
Music  
Canada



Jamie Bankhead  
Programming  
United Kingdom



Ned Birkin  
Programming  
United Kingdom



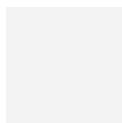
Matthias Bonnard  
Programming  
Switzerland



Jérémy Bouchard  
Music  
Canada



Annie Brochu  
Medicine  
Canada



Gareth Brown  
Graphism  
United Kingdom



Sonia Christ  
Respiratory XP  
Switzerland



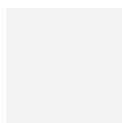
Nicolas Doduik  
Support  
France



Clément Drévo  
Support  
Switzerland



Lai Tse Fan  
Support  
Canada



Lynn Foster  
Support  
USA



Stéphane Gobron  
Support  
Switzerland



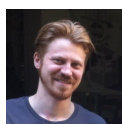
Bob Haugen  
Support  
USA



Gérald Huguenin  
Support  
Switzerland



Calin Ionescu  
Support  
Switzerland



Povilas J  
Hardware  
Canada



Typhaine Juvet  
Support  
Switzerland



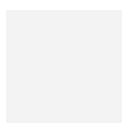
Shanti Kronig  
Game design  
Switzerland



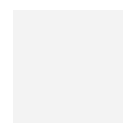
Daniel Regazzoni  
Respiratory XP  
Switzerland



Aïcha Rizzotti  
Support  
Switzerland



Helder Santos  
Hardware  
Italy



Leora Simon  
Respiratory XP  
Canada



Cyriaque Skrapits  
Programming  
Switzerland



The Thanh Diem  
Nguyen  
Medicine



Julie Vallette  
Support  
France



Christian Voirol  
Support  
Canada

## Other contributors

Bokar	Philippe Caignon	Damien Galan	Naj Mahani	Liliana Palomino	Melissa Tamporello
Chloe	Robin Dylan Cats	Hafen Gaudenz	Marc-André Maheu	Sandra Pelaez	Mark Thompson
Clément	Lucile Chabre	Manon Gaudet	Marco Manca	Véronique Pepin	
Erell	Frédérique Chedevert	Stéphane Geiser	Cristina Mahneke	Kevin Piccand	Pauline Valette
Jacques	Peter Chernoff	Sylvie Gendreau	Jacques-E. Marcotte	Juan-Pablo Pimentel	Sophie Varone
Julien	Antoine Chevalier	Jean-Sébastien Gervais	Nadia Marquis	Laurent Pouget	Saskia Vellas
Lucie	Léa Chiffelle	Marc-Antoine Giguère	Nicole Martin		Francois Vermuelen
Maxime	Pamela Chiuppi	Tristan Glatard	Sebastian Martinez	Humberto Quintana	Yanick Vezina
Pierre	Sonia Christ	Béatrice Godot	Dominique Massie		
Salomé	Wendy Chung	Viviana Gozzi	Nibe Mbumba	Jérôme Rabbe	Alexandre Wegmuller
Theo	Dominique Correia	Alex Gray	Trevor Meier	Evy Raelison	Peter Wilkinson
	Kevin Cottier	David Grunenwald	Jérémy Méjane	Claire Reierson	John Willimann
Othmane Adnane	Marc-Arnaud Cotting	Ivan Gulizia	Mark Melnykowycz	Simon Riverin	
Ahmed Akl	Sophie Courchesne		Marguerite Mendell	Yenzo Rodrigues	Lulu Xing
Chris Altmikus		Pranav Harakere	Sarah Meunier	Aurelia Roman	
Henrique Alves	Thomas Dagueneil	Leo Hartman	Pauline Meyer	Andres Romero	Kevin Yang
Rania Aoun	Quentin de Halleux	Maya Hartmeier	Tammy-Lea Meyer	Laurent Ropers	Qahtan Yaroub
	Thierry de Reydet	Alexander Havas	Gregory Moullec	Pauline Rossel	
Claudia Balli	Alfredo de Romana	Laurence Huber	Walid Miled	Patrice Roy	Alexis Zalini
Fanny Balsiger	Lucas Delvalle		Salomé Minard		Claudio Zalini
Jane Banks	Emilie Desforges	Manuel Izquierdo	Kostia Miteskyy	Samir Sangani	Andrei Zanesco
Marco Barahona	Guillaume Devaud		Florian Moncomble	Amélie Sauter	Julyan Zeltner
Nina de Beauvais	Jonathan Dextraze	Fabien Jeanneret	Youssef Mohammad	Aurélie Schneider	Yaxi Zhao
Annick Bedard	Nicolas Dextraze	Levan Jeanneret	Patricia Morales	Megann Stephan	
Kim Berthiaume	Van Do		Camille Morasse	Damien Sekularac	
Rhonda Boateng	David Drummond	Najmeh Khalili		Patricia Sigam	
Jérémy Bouchard	Kadeem Dunn	François-Eric King	Pascal Nataf	Nicole Silva	
Jocelyne Bouchard	David Duguay	Flavien Knuchel	Jonathan Ng	Julien Silvestrini	
Amelie Bouita	Tony Duong	Philip Koenig		Nathalie Sommer	
Julien Bouix	François-Xavier Dupas	Cem Koker	Isis Ortiz	Ruth Stauffer	
Elise Boulay	Valérie Durand		Renaud Ory	Justine Sun	
Daniel Brastaviceanu		Sophie Laberge			
Mario Broeck	Nathalie Ebnoether	Béatrice Langellier			
Jurdak Brooke		Madeleine Lauger			
Francis Brosseau	Léo Ferland	Tomy-Richard Leboeuf			
Matthew Brown	Aurélien Folie	Pierre-Mikael Legris			
Pierre Philippe Brûlé	Lynn Foster	Jonathan Lessard			
	Jack Four	Giovanni Lo Presti			
	Julien François	Sarah Lozinski			
	Noah Frangos				

If your name is missing,  
please write us at  
[breathinggames.net](mailto:breathinggames.net)



## Collaborations



### France

Cochin university hospital	HX
Necker university hospital	HX
Fondation Arc-en-Ciel	HX
La Maison des Parents	
French Hospitals Fed. – Fonds FHF	\$
Grand Besancon Metropole	

### Italy

National Research Council – IBIR	HX
WeMake Milan	CX
OpenCare (European Union)	\$

### Switzerland

Geneva university hospitals	H
Geneva foundation against CF	\$X
Geneva Health Forum	
University of applied sciences HE Arc	IX
Lift	IX
Open Geneva Festival	
Swiss Game Center	X
University of Geneva	I\$X
Geneva foundation	\$

### South Korea

Korea University	HX
Karl Polanyi Institute Asia	IX
SVS Fund	X
Yonsei University	\$X
CityPreneurs	\$

### Canada

Sainte-Justine university hospital	HI\$X
Quebec university hospital	HX
Sensorica	IX
Haply	IX
Canada Institutes of Health Research	\$
Concordia University	I\$X
Sustainability Action Fund	\$

H hospital | infrastructure \$ funding X expertise provided

## Funding

The Breathing Games commons exists thanks to the time offered by our community – over four years full-time equivalent.

The funding received enabled us to organize co-creation events (mostly hosting, food, transportation), research, and ensure essential developments. The tables below give an overview of revenue and expenses by country since the beginning of the initiative. In-kind contributions are not included, except to a lesser extent for Canada (5630 CAD). Funds are managed via different structures, depending on the type of funding (donation, research grant, etc.).

### Switzerland

Grants for co-creation, managed by the Breathing Games Association.

External audit realized for the 2019 accounts. CHF.

Expenses	26165.85	Revenues	26165.85
Game jams	21862.23	Foundation in Geneva	20000.00
Admin fees	1892.40	BG France	6165.85
Web presence	1805.75		
Banking fees	175.95		
Covid loss	330.10		

Funds managed by third parties. CHF.

Expenses	97600.00	Revenues	97600.00
Research	48400.00	Seed fund HE Arc	48400.00
Game jams	40000.00	Foundation in Geneva	40000.00
Co-facilitation	9200.00	Geneva U - partnership	9200.00

### France

Grant for co-creation, managed via Balli's structure (requirement). EUR.

Expenses	54000.00	Revenues	54000.00
Game jams	16800.00	Fonds FHF	54000.00
Development	22080.00		
Devices	3106.00		
Taxes planned	10294.00		

### Canada

Grants for co-creation and research, most managed by Concordia U. CAD.

Expenses	48556.27	Revenues	48556.27
Redistribution	23671.09	Forces Avenir	2000.00
Research	11418.00	CHU Ste Justine health pr.	2770.00
Travel	4580.24	CHU Ste Justine pneumo	3000.00
Food	3541.61	Concordia CCSL	4500.00
Electronics	3219.25	Concordia SAF	7800.00
Material	1477.08	Concordia GCBF	3000.00
Space	649.00	Concordia INDI	100.00
		Concordia CUAA	1000.00
		Can Instit Health Research	22530.00
		Breathing Games	2176.75
		Individual donations	420.00
		Transit BG	666.28

### Italy

Grant for hardware, managed by WeMake. EUR.

Expenses	472.56	Revenues	472.56
Electronics	472.56	OpenCare	472.56

### South Korea

Funds managed by third parties. KRW.

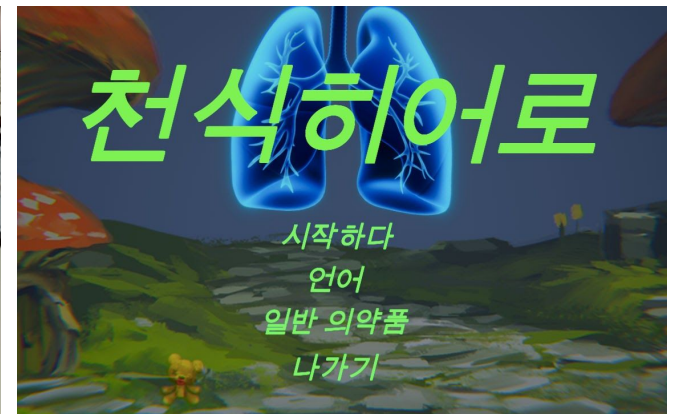
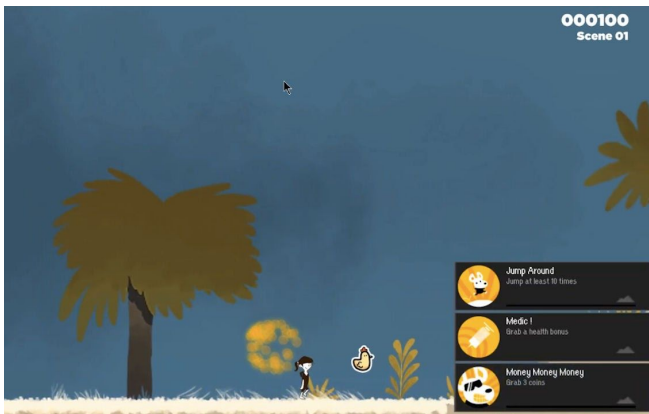
Expenses	12020000	Revenues	12020000
Co-facilitation	12020000	Yonsei U - partnership	12020000

2020

We were invited to host a joint event for the Geneva Health Forum (global health, 2000 participants) and Open Geneva (40 civil society hackathons, 1500 participants). We sketched the 'Open Village,' a hands-on event to promote freely reproducible material for health. Following the pandemic, this event was postponed to November. In the meanwhile, we created [coronavirus-openkit.net](https://coronavirus-openkit.net), a fully editable website to list hackathons and open-source material against covid. We also did an interview with Prof. Pittet, who spread the alcohol-based hand rub patent-free, which saved 8 million lives yearly – before covid.

Regarding the games, we focus on developing the Rise multiplayer to promote respiratory and mental health. Asthma Heroes was also translated in Korean. Co-creation events planned in Paris and Besançon as well as different communications were also cancelled or postponed.

We are also professionalizing our structure, and asked for an external audit of the Breathing Games Association bookkeeping for 2019.



#### Co-creation events

- Mar 21 Presentation of co-creation results, online (covid)
- Nov 15-19 Open Village, Geneva Health Forum, Geneva
- ...

#### Communications

- Feb 3-5 Open Hardware from Academia Incubator, Bath
- June 11 Workshop Public Health Schweiz, online
- ...

Play is, like oxygen, “all around us, yet goes mostly unnoticed or unappreciated until it is missing.”

Dr Stuart Brown

# 2019

We invite young adults in Paris to create games around their experience of cystic fibrosis. We clinically test games in Montreal and Palermo, and improve and validate our game controller in Paris, Geneva and Montreal. Our initiative is broadcasted on the Swiss telejournal (300000 viewers).



## Co-creation events

- Mar 9-10 Clinical study, Sainte-Justine, Montreal
- Mar 17-18 **Game jam**, Necker hospital, Paris
- Mar 20-24 **Game jam**, OpenGeneva Festival, Geneva
- Apr 14-16 Hackathon team, Arkathon, Sion
- Jun 19-20 Micro game jam on virtual reality, Concordia U, Montreal
- Oct 13-17 **Game jam**, Fondation Arc-en-ciel, Besançon
- Oct 19-20 **Game jam**, Necker hospital, Paris

## Communications

- Feb 27 Libraries colloquium on games and education, Montreal
- Mar 20 Panel, Meet the makers of a better world, Geneva
- Apr 11 Exhibition, World Summit on Info Society forum, Geneva
- Jul 5 Poster, Gamification & SG Symposium, Neuchâtel
- Jul 11 Serious Play Conference, Montreal
- Jul 31-Aug 5 Gathering Open Science Hardware, Toronto
- Aug 27-Oct 2 CityPreneurs, Seoul
- Sept 27 European nights of research, Palermo
- Oct 25-27 Poster, **general meeting of GARD**, Beijing
- Nov 25 Presentation, Tsinghua SDG OpenHack, Beijing



## 2018

This year, we continue to develop seven games – Asthmonautes, Respi Heroes, LungLauncher, Bloïd, PeakFlow, PeakLeap and TikiFlow, see page Games – that will be clinically tested in 2019.



### Co-creation events

- Apr 12-15 **Game jam**, OpenGeneva Festival, Geneva
- Nov 5-13 Residence, Eco2fest, Montreal

### Communications

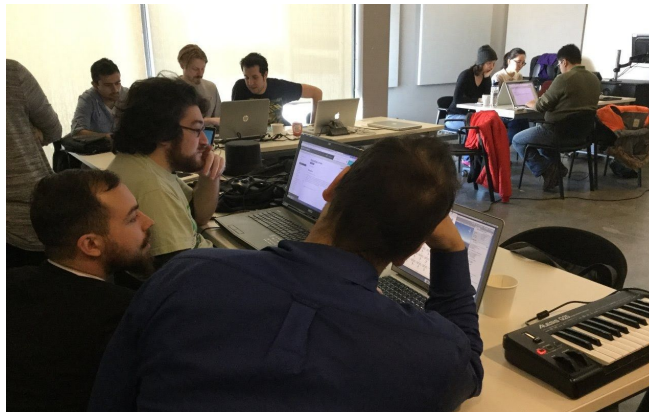
- Jan 13 Presenting to the research collective OMNSH, Paris
- Apr 3 Webinar at McGill University Game Lab, Montreal
- Apr 10 Quebec innovation week Sainte-Justine, Montreal
- Aug 31 Poster, **general meeting of GARD**, Helsinki
- Oct 12 Poster, Canadian Arts Therapy Conference, Montreal
- Oct 26 Photograph for 50 years of planning at UdeM, Montreal
- Nov 5 Presenting to PME MTL during Eco2fest, Montreal

## 2017

Breathing Games is funded by the Canadian Institutes of Health Research (strategy for patient-oriented research) and by the French Hospitals Federation (research and innovation fund). The first is a collaboration with Concordia University and CHU Sainte-Justine, the latter with Necker and Cochin hospitals.

Three game jams are held, as well as many scientific communications. A 3d-printed modular bed to test pressure and flow sensors is developed during a two-week maker in residence funded by the Horizon 2020 program of the European Union.

80 participants attend a screening of A new Economy, followed by a panel with social innovation experts Marguerite Mendell and Jean-Martin Aussant. The documentary is also released on Netflix. Breathing Games is also presented in an audio interview broadcasted by Les jeux sont faits.



### Co-creation events

- Feb 18-19 [Game jam](#), Concordia U, Montreal
- Mar 1-3 [Game jam](#), Lift:Lab, Geneva
- May 25-26 Workshops on blockchain, C2 Mtl, Montreal
- Jun 3-10 [Game jam](#), Concordia U, Montreal
- Jun 21-Jul 8 Maker in residence OpenCare, WeMake, Milan
- Nov 30- Dec 2 Keynote and workshops Collaborate and learn/teach differently, Concordia U + CHU Sainte-Justine, Montreal

### Communications

- Mar 24 Presentation, [Gathering Open Science Hardware](#), Chile
- Mar 24 Presentation, Global Goals Innovation Day, Geneva
- Mar 25 Presentation, Oxford U Global Challenge, Calgary
- Mar 25 Presentation, Concordia Education Symposium, Montreal
- Apr 12 Presentation, European Academy of Design, Rome
- May 10-12 Presentation and posters, ACFAS congress, Montreal
- Oct 6 Presentation on game jams, Lausanne U, Lausanne
- Oct 20 Presentation, OpenVillage Festival, Brussels
- Nov 3 Panel, [Canadian Science Policy Conference](#), Ottawa
- Nov 9 Poster, [general meeting of GARD](#), Brussels

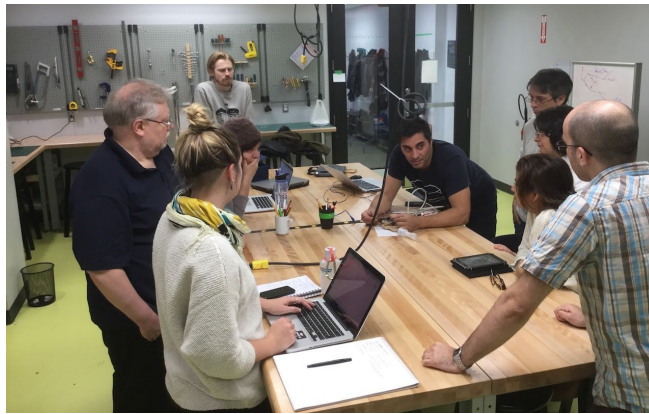
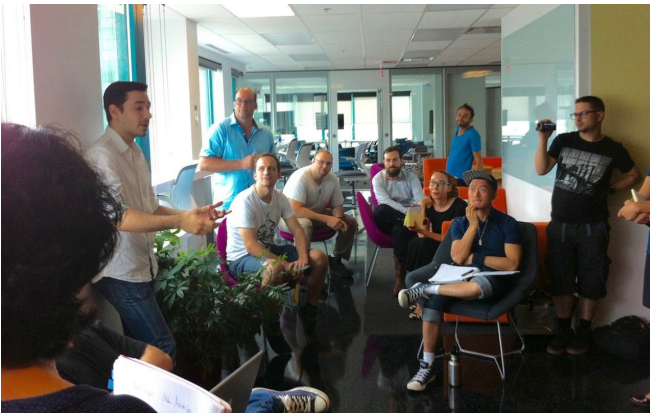


## 2016

Breathing Games joins the [Open Source Initiative](#), and becomes a signatory of the [United Nations Global Compact](#), a commitment of organizations to “strive towards a world that benefits everyone, especially the future we borrow it from.”

Three game jams are held. An engineering student creates a core for different games, which centralizes data collection, settings and therapy patterns. Interviews from 16 contributors are released on our [YouTube channel](#).

In collaboration with the Lung Association of Québec, we apply to the Google Impact Challenge, a five million dollar grant to help ten initiatives tackle the biggest social challenges (not selected).



### Co-creation events

- Feb 10-12 [Game jam](#), Lift Conference, Geneva
- Aug 5-7 [Game jam](#), Concordia U, Montreal
- Aug 10-12 Workshop Health & Play, World Social Forum, Montreal
- Nov 7 Workshop Open Hardware, Concordia U, Montreal
- Nov 12-13 [Game jam](#), Concordia U, Montreal

### Communications

- May 12 Presentation, ACFAS congress, Montreal
- June 9 Presentation, European CF Conference, Basel
- Aug 17-19 Workshop, [Symposium on Open Collaboration](#), Berlin
- Oct 3 Poster, FRQS congress on respiratory health, Montreal
- Nov 21 Poster, [Quebec annual public health days](#), Montreal
- Nov 22 Presentation, Mobile health apps colloquium, Montreal

## 2015

Eight researchers from the University of Applied Sciences Western Switzerland (Arc) start a study to evaluate the adequacy and cost of a serious game to increase respiratory compliance. We also collaborate with Sainte-Justine hospital to develop and test games for children who have asthma.

Breathing Games collaborates with Sensorica, a peer-production network specialized in open source hardware. We adopt its Value Accounting System, a platform that allows to log contributions in time, money or material and to redistribute funds with an equation.

An engineering student documents the cystic fibrosis practice in Switzerland and does a thorough reflection on the game design. Another engineering student adapts a software library to capture the noise made by mouthpieces used in cystic fibrosis treatment.

News about Breathing Games appear in national and regional CF newsletters in Spain. The team of Domain 7 follows Sensorica and Breathing Games for a documentary about “people making a fresh start towards building a new Economy.”



### Co-creation events

- June 5-7 Hackathon, Arkathon, Sierre
- Aug 28-29 Hackathon, Sensorica, Montreal

### Communications

- June 11 Poster, European Cystic Fibrosis Conference, Brussels
- Oct 29 Presentation, symposium on collaboration, Montreal



## 2014

Begin of the initiative as part of graduate studies in game design at Montreal University. Fabio Balli and Yannick Gervais build on the work done previously by John Danger. After developing the first prototype, a preliminary study is realized with ten children at Sainte-Justine hospital. The team is a finalist of Forces Avenir, which aims to recognize socially conscious students.

A website is created, and receives the certification “Health on the Net,” which aims to foster quality, objective and transparent medical information.

A sociology student writes a dissertation about serious games, describing opportunities and limits of our initiative and another project. A blog article about the initiative is written by Canada Research Chair on Health Innovations.



### Co-creation events

- Feb 21-23 Hackathon, CHU Sainte Justine, Montreal
- Nov 5-6 Hackathon, Montreal Summit on Innovation, Montreal

## Games

Most games are developed on Unity as we have no resources to contribute to developing a free/libre engine like Godot.

### Asthma



**Asthma Heroes**  
Prevention and management of crises, 7-12 yo  
45 minutes, Unity, Windows computer  
**Actively developed – beta, tested**



**Asthmonautes**  
Prevention and management of crises, 7-12 yo  
45 minutes, GameMaker, Windows computer  
**Developed – RC, tested**



**LungLauncher**  
Prevention of asthma crises, 7-12 yo  
4 minutes, Unity, Android smartphone  
**Developed – RC, tested**

### Peer support for all (with contents for COPD, cystic fibrosis)

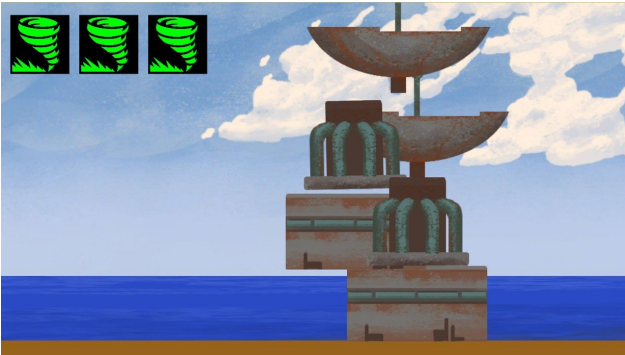


**Rise**  
Mutual care in respi and mental health, 8+ yo  
10 minutes, Unity, Windows computer  
**Actively developed – alpha**



**DicoSym**  
Mutual care in respi and mental health, 16+ yo  
5 minutes, Unity, Android smartphone  
**Actively developed – beta**

## Breathing exercises and health promotion



TikiFlow

Self screening of lung capacity (peak flow)  
3 minutes, Unity, Android smartphone  
**Actively developed – beta, tested**



Bloïd

Breathing exercise for stress reduction  
5 minutes, Unity, Windows computer  
**Actively developed – alpha, tested**



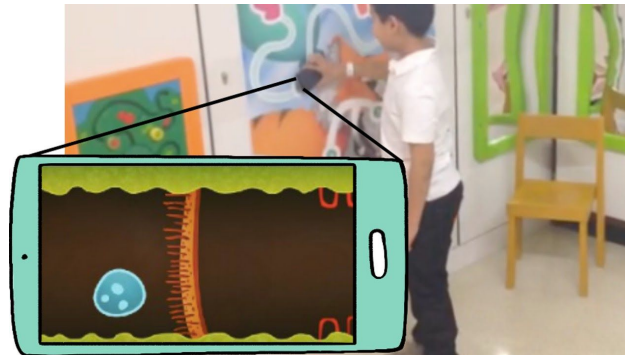
VR game

Exploring artwork related to breathing  
5 minutes, Unity, Windows computer  
**Actively developed – alpha**



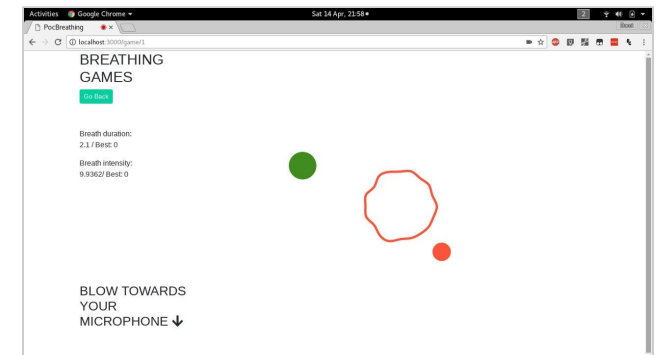
Mille-feuilles

Breath. exercise to increase lung volume (COPD)  
3 minutes, Unity, Windows or Mac computer  
**Prototyped**



Pulmo

Respiratory health awareness  
5 minutes, Unity, Android smartphone  
**Prototyped**



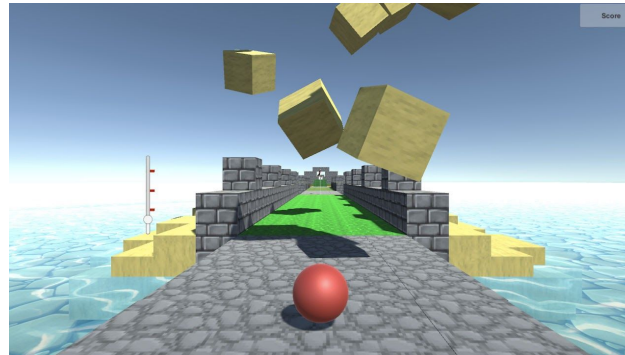
PocBreath

Breathing toy  
3 minutes, JS, Browser on smartphone  
**Prototyped**



## Discontinued prototypes

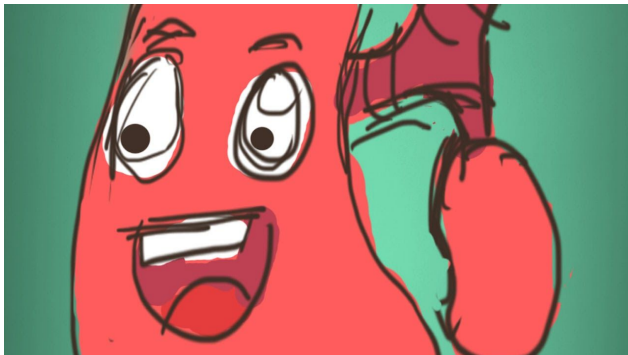
Following games were discontinued to the benefit of more functional games.



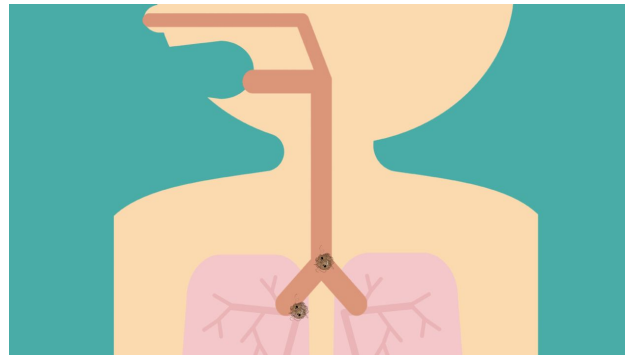
PeakFlow – Self screening of lung capacity



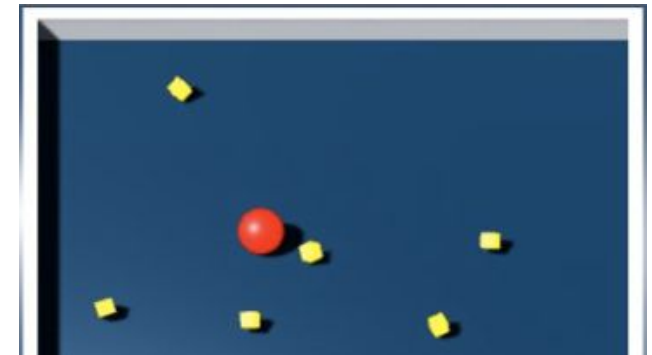
PeakLeap – Self screening of lung capacity



BreathingApp – Asthma medication follow up

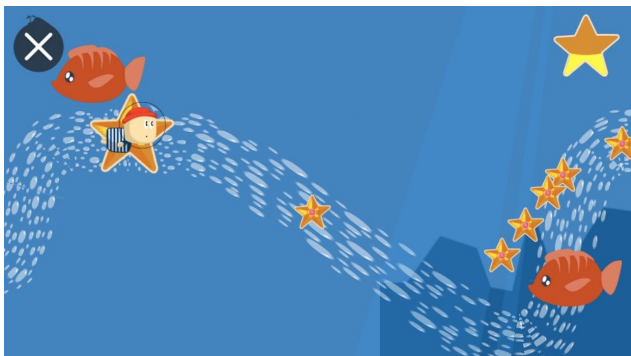


Pulmination – Removing allergens

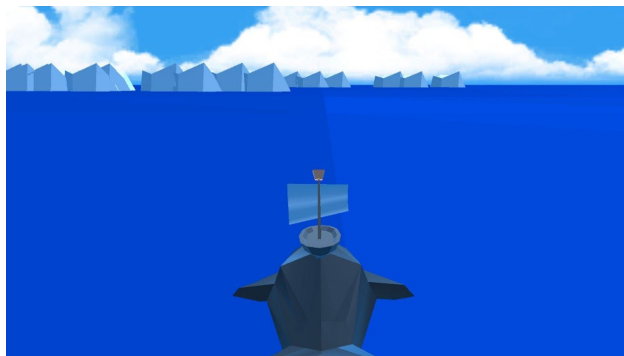


RollABall – CF airway clearance





Heritages – CF airway clearance



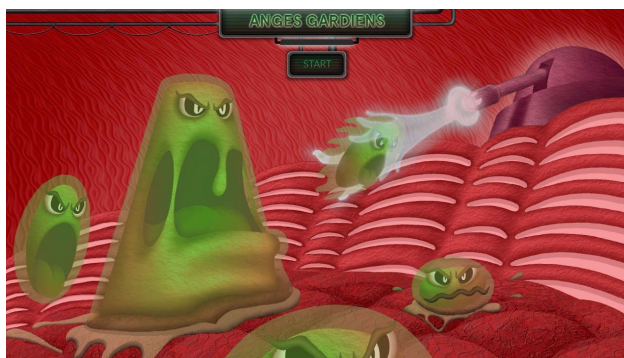
Les aventures du Briand – CF airway clearance



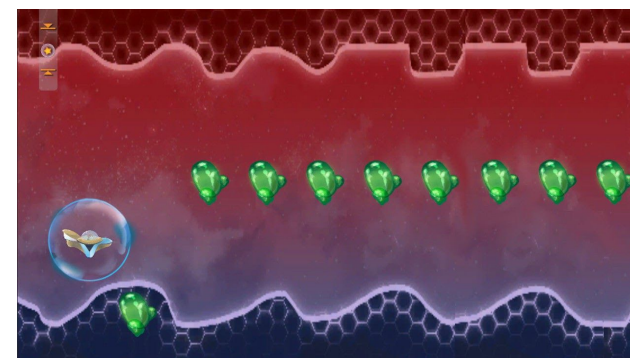
Celebrations – Respi health promotion (concept)



Globule – CF airway clearance



Ange-Gardien – CF airway clearance



PEP Hero – CF airway clearance

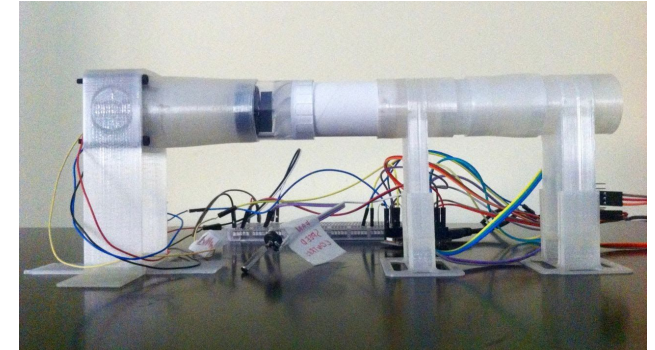
## Hardware



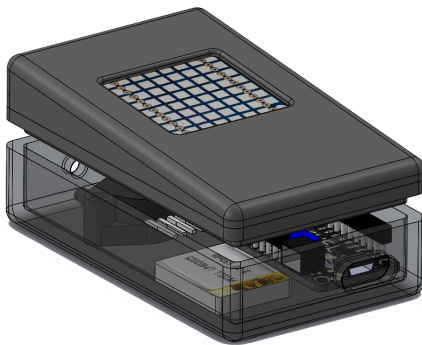
Spirotroller enhanced  
Game controller measuring the expiratory flow,  
3d-printed, Bluetooth and USB, three buttons  
Direct use  
**Actively developed**



Spirotroller  
Game controller measuring the expiratory flow,  
3d-printed, Bluetooth and USB, one button  
Direct use  
**Prototyped**



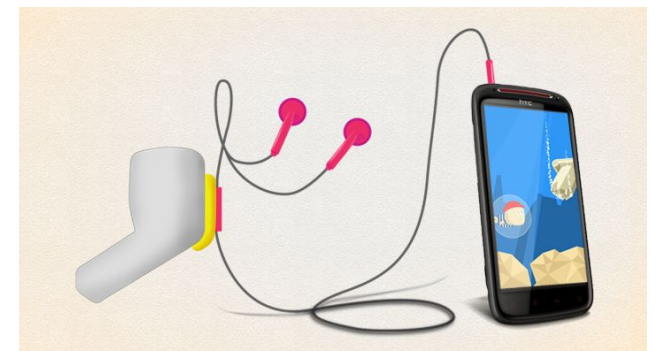
Modular test bench  
Bench including fan and modules to assess a  
variety of sensors in different settings  
Direct use  
**Prototyped**



Led box  
Controller measuring the expiratory pressure,  
3d-printed, Bluetooth and USB, 8x8 LED matrix  
Use with mouthpiece  
**Prototyped**



3D organic box  
Controller measuring the expiratory pressure,  
3d-printed, USB, 1 LED  
Use with mouthpiece  
**Actively developed**



Sound library  
Library analyzing the noise via a standard micro  
set affixed to a mouthpiece  
Use with oscillating mouthpiece  
**Prototyped**

## Research

This page summarizes research activities in Canada, France, Switzerland, Italy and South Korea.

Time	Activity	Team	Organizations	Major funding
2019-now	Combining air quality (fine dust) and breath sensing	Changsoo Kim, Jean-Henry Morin, Emmanuel Kellner, Fabio Balli	Yonsei and Geneva Universities, LogAir	UNIGE-Yonsei Seed Fund
2019-now	n children with asthma test a game	Yoo Young, Guillaume Jeanmaire, Fabio Balli	Korea University, Anam hospital	–
2019-now	n children with asthma test a game from home	Stefania La Grutta, Laura Montalbano, Fabio Balli	IBIR-CNR	–
2019-now	Involving young adults with CF in creating games to foster self-care	Isabelle Sermet-Gaudelus, Pierre-Régis Burgel, Maya Kirszenbaum, Julie Valette, Marlene Clairicia, Aline Lustre, Damien Fangous, Fabio Balli	Necker and Cochin hospitals	French Hospitals Federation Fonds FHF
2019-2020	140 children with asthma test a flow-based game controller	Sze Man Tse, Myriam Bransi, Alena Valderrama, Fabio Balli	Sainte-Justine + Quebec hospitals, Concordia University	Canadian Institutes Health Research, Concordia U
2019-2020	Ten children with asthma test four games	Sze Man Tse, Alena Valderrama, Maria Frangos, Fabio Balli	Sainte-Justine hospital, Concordia University	Canadian Institutes Health Research, Concordia U
2017-now	Interviews of contributors	Maria Frangos	Maria Frangos	–
2015-2016	Pre-study on serious games for cystic fibrosis → asthma	Christian Voirol, Aïcha Rizzotti, Typhaine Juvet, Gérald Huguenin, Stéphane Gobron, Nicolas Wenk, Calin Ionescu, Pauline Meyer, Fabio Balli	University of applied sciences Arc	Fonds d'impulsion HE Arc
2014	Ten children with CF test games with a pre-post survey	Annie Brochu, Nadia Marquis, Isabelle Tellier, Jacques-Édouard Marcotte, Sophie Laberge, The Thanh Diem Nguyen, David Duguay, Pascal Nataf, Yannick Gervais, Fabio Balli	Sainte-Justine hospital	–
2014-now	Documenting the co-creation	Various	Various	–



# Publications

## Book chapters

- Wu Ann, Tse Sze Man, Balli Fabio. Mobile Applications and Wearables for Chronic Respiratory Disease Monitoring. In Gomez JL, Himes BE, Kaminski N. **Precision in Pulmonary, Critical Care, and Sleep Medicine**. Humana Press 2020. DOI: 10.1007/978-3-030-31507-8.

## Scientific articles

- Balli F. Developing Digital games to address airway clearance therapy in children with cystic fibrosis: participatory design process. **JMIR serious games** 2018; 6(4). DOI: 10.2196/games.8964
- Balli F. Game jams to co-create respiratory health games prototypes as participatory research methodology. **Forum: qualitative social research** 2018; 19(3). DOI: 10.17169/fqs-19.3.2734.

## Professional articles

- Balli F. Inspiring to play: Co-Creating Games for Respiratory Health in Montreal, Paris and Geneva. **Newsletter of the Global alliance against chronic respiratory diseases**; 2019; 2(2). [www.gard-breathefreely.org](http://www.gard-breathefreely.org)
- Brastaviceanu T, Lloyd T, Balli F. Production participative de matériel de recherche. In F Balli, J Lebel (eds). Recherche et communs : vers des sciences ouvertes. **ACFAS magazine** 2019.

## Reports and guidelines

- GARD members. **Beijing call to action for lung health promotion**. Global Alliance against chronic Respiratory Diseases 2019. [www.gard-breathefreely.org](http://www.gard-breathefreely.org).

## Scientific abstracts

- Wenk N, Balli F. Breathing Games – Free/libre and open source games for respiratory health. **Gamification & serious game symposium** 2019; Jul 24; Neuchâtel, Switzerland.
- Frangos M, Balli F. Breathing Games: Promoting Respiratory Health Through Co-creation. **The Design Journal** 2017;20(sup 1). DOI: [10.1080/14606925.2017.1352976](https://doi.org/10.1080/14606925.2017.1352976).

- Balli F. Health & Play – Addressing together the challenges of creating an open source standard for Breathing Games. In: **Companion to the proceedings of the 12th International Symposium on Open Collaboration**; 2016 Aug 17-19; Berlin. New York: ACM. DOI: [10.1145/2962132.2962138](https://doi.org/10.1145/2962132.2962138).
- Balli F, Gomez V. Therapeutic adherence: exploring Open Collaboration to mobilize all stakeholders behind children with CF. **Journal of Cystic Fibrosis** 2017; 15(1). DOI: [10.1016/S1569-1993\(16\)30478-7](https://doi.org/10.1016/S1569-1993(16)30478-7).
- Brochu A, Marcotte JE, Marquis N, Laberge S, Duguay D, Nataf P, Gervais Y, Balli F, Nguyen T. 2015. Video games for positive expiratory pressure (PEP) therapy in children with cystic fibrosis: a pilot study. **Journal of Cystic Fibrosis** 2015; 14(1). DOI: [10.1016/S1569-1993\(15\)30030-8](https://doi.org/10.1016/S1569-1993(15)30030-8).

## Scientific presentations

- Balli F. Building communities around a cause. **SDG innovation Bootcamp**; 2019 Oct 25; Beijing, China.
- Balli F. Breathing Games On Air: Co-Creating a Board Game around the Breath. **Serious Play Conference**; 2019 July 12; Montreal, Canada.
- Balli F, Frangos M. Respiratory health and air quality: fostering self and mutual care. **Gathering for Open Science Hardware**; 2019 July 31; Toronto, Canada.
- Balli F. Des jeux qui inspirent : bien commun et innovation en santé. **Colloque jeux et éducation des Bibliothèques de Montréal et de la BAnQ**; 2019 Feb 27; Montreal, Canada.
- Balli F. Game jams to co-design respiratory health games in Canada and Europe. Webinar. **Participatory Research at McGill Game Lab**; 2018 Apr 3; Montreal, Canada. On [youtu.be/IATVTHMIK8Q](https://youtu.be/IATVTHMIK8Q).
- Balli F. Commons and Breathing Games. **General Assembly of Observatoire des Mondes Numériques en Sciences Humaines**; 2018 Jan 13; Paris, France.
- Balli F, Dugas B. Everyone should be able to adopt (lifesaving) health innovation. **OpenVillage Festival**; 2017 Oct 20; Brussels, Belgium.

- Balli F. Les game jams comme méthode d'apprentissage expérientiel et de co-création interdisciplinaire. **Colloque international sur le jeu vidéo comme objet de recherche et médium pédagogique de l'Université de Lausanne**; 2017 Oct 7; Lausanne, Switzerland.
- Balli F, Caignon P. Apprentissage transformationnel en éducation de la santé : de la gestion de la maladie à l'appropriation de la santé par la communauté. **Colloque La mesure et l'évaluation des apprentissages complexes en éducation médicale : défis et enjeux du Congrès ACFAS**; 2017 May 12; Montreal, Canada.
- Balli F, Simon L, Frangos M, Fan LT, Folie A. Take a deep breath. **Canadian Finals of the Oxford University Global Challenge**; 2017 Mar 25; Calgary, Canada.
- Balli F. Ensuring Everyone's Right to Respiratory Health: Participatory Research and Knowledge Co-Creation. **INDI research day of Concordia University**; 2017 Mar 16; Montreal, Canada.
- Balli F, Valderrama A. Création collective de jeux libres en santé : communs, recherche participative et blockchain. **Colloque Applications mobiles en santé : des usages aux enjeux éthiques, déontologiques et juridiques du Réseau de recherche en santé des populations du Québec**; 2016 Nov 22; Montreal, Canada. Video: [youtu.be/Mmx9GdQ8ZEA](https://youtu.be/Mmx9GdQ8ZEA).
- Balli F. Health & Play – Addressing together the challenges of creating an open source standard for Breathing Games. **12th International Symposium on Open Collaboration**; 2016 Aug 17-19; Berlin, Germany.
- Balli F. Health & Play – Mobilizing citizens around breathing autonomy. **World Social Forum**; 2016 Aug 3; Montreal, Canada.
- Balli F. Which psychosocial messages for a health game? **European Psychosocial Special Interest Group Meeting of the 39th European Cystic Fibrosis Conference**; 2016 Jun 8; Basel, Switzerland.
- Balli F, Voirol C. breathinggames.net: vers un standard libre pour se soigner par le jeu. **Colloque Les sciences sociales et humaines au cœur de l'innovation – Innovation en santé du congrès ACFAS**; 2016 May 12; Montreal, Canada.
- Thai M, Brastaviceanu T, Balli F. Nul n'est prophète en son pays - Pourquoi la Maison Blanche s'intéresse au modèle de Sensorica ?

**Colloque de mobilisation des connaissances sur les thèmes de la collaboration et de l'innovation**; 2015 Oct 15; Montreal, Canada.

### Professional presentations

- Balli F. Open Geneva and inclusion. **Fête de l'innovation**; 2019 May 28; Geneva, Switzerland.
- Balli F. Breathing Games: population-driven health tech. **Eco2fest at PME MTL**; 2018 Nov 5; Montreal, Canada.
- Dugas B, Balli F. Free/libre hardware. Conferenza OpenCare. **Digital Social Innovation and the Future of Care**; 2017 Nov 22-23; Milano, Italy.
- Balli F. Jeux et matériel libres en santé respiratoire : enjeux de conception et de distribution. **Journée internationale du logiciel libre**; 2017 Sept 16; Montreal, Canada.
- Balli F. Health & Play – Mobilizing citizens around breathing autonomy. **World Social Forum**; 2016 Aug 3; Montreal, Canada.

### Scientific posters

- Balli F, Tse SM Kirszenbaum M, Montalbano L, La Grutta S, Jeanmaire G, Gervais Y, Wenk N, Fangous D, Gaudy T, Marthe C, Bransi M, Gomez V, Robin JF, Clairicia M, Mendell M, Valderrama A, Kellner E, Martischang R, Caignon P. **Mutual care taking: collectively creating our respiratory wellbeing with open sciences**. **13th General Meeting of the Global Alliance against chronic Respiratory Diseases – World Health Organization**; 2019 Oct 25-27; Beijing, China. DOI: 10.5281/zenodo.3451506.
- Wenk N, Balli F. Breathing Games – Free/libre and open source games for respiratory health. **Gamification & serious game symposium 2019**; Jul 24; Neuchâtel, Switzerland.
- Balli F, Gingras S, Gervais Y. Air, breath and the co-creation of meaning. Can games help break free from limiting beliefs? **Annual Canadian Arts Therapy Conference**; 2018 Oct 12; Montreal, Canada.
- Balli F, Gervais Y, Frangos M, Gaudy T, Valderrama A, Bransi M, Pache C, Tse SM. **Next-gen advocacy for respiratory health: fun, empowering, participatory, freely adaptable**. **12th General Meeting of the Global Alliance against Respiratory Diseases – World Health**

**Organization; 2018** Aug 31; Helsinki, Finland. DOI: 10.5281/zenodo.1344629.

- Balli F et al. **When populations care about their respiratory health: a scalable bottom-up model to foster self-care for all. 11th General Meeting of the Global Alliance against Respiratory Diseases – World Health Organization; 2017** Nov 11; Brussels, Belgium. DOI: 10.5281/zenodo.1344084.
- Balli F, Gomez V. Science ouverte : les données de santé gérées par des réseaux d'utilisateurs. **Colloque Dédouaner les données ! Accès, utilisation et retombées pour la recherche en santé du congrès ACFAS; 2017** May 11; Montreal, Canada. DOI: 10.5281/zenodo.1420487,
- Balli F, Maheu-Cadotte MA, Bouix J, Valderrama A, Vermeulen F, Wenk N, Tse SM, Burgel PR, Sermet-Gaudelus I, Martischang R, Kirszenbaum M, Frangos M, Ebnoether N, Gomez V, Gingras S. Évaluation par des méthodes mixtes de l'impact sociétal de Breathing Games, une communauté interdisciplinaire co-crédant des technologies libres en santé. **Colloque Les innovations en méthodes mixtes en sciences sociales et de la santé du congrès ACFAS; 2017** May 10; Montreal, Canada. DOI: 10.5281/zenodo.1406778.
- Frangos M, Balli F. Breathing Games: Promoting Respiratory Health Through Co-creation. **European Academy of Design Conference; 2017** Apr 12-14; Rome, Italy.
- Balli F, Fan LT. Health Education: Playing and Creating Games. **Graduate Symposium in the Department of Education of Concordia University; 2017** Mar 25; Montreal, Canada.
- Valderrama A, Balli F, Tse SM, Gomez V. Développer des compétences en maladies chroniques à travers une application mobile conçue de manière innovante. **Journées annuelles en santé publique; 2016** Nov 21-22; Montreal, Canada.
- Tse SM, Valderrama A, Balli F, Gomez V. A free/libre mobile app in childhood asthma: knowledge transfer and self-assessment of

symptoms and lung function. **Congrès québécois en Santé respiratoire; 2016** Oct 11-14; Montreal, Canada.

- Balli F, Gomez V. Therapeutic adherence: exploring Open Collaboration to mobilize all stakeholders behind children with CF. **European Cystic Fibrosis Conference; 2016** Jun 8-11; Basel, Switzerland.

### Panels

- Balli F, Dosemagen S, Knäpper I, Niggli N, Nimkar R (panelists), Michel S (facilitator). **Geneva Solutions: Meet the Makers of a Better World 2019;** Mar 20, Geneva, Switzerland.
- Brastaviceanu T, Balli F, Frangos M. Open Science and Innovation. **9th Canadian Science Policy Conference; 2017** Nov 3; Ottawa, Canada. Video: [youtu.be/fP32bzSh-fs](https://youtu.be/fP32bzSh-fs).

### Exhibitions

- La Grutta S, Montalbano L, Gervais Y, Balli F. **Notte europea dei ricercatori; 2019** Sept 27; Palermo, Italy.
- Frangos M, Balli F. Gathering for Open Science Hardware. **Public demo and seminar at the University of Toronto; 2019** July 31; Toronto, Canada.
- Wenk N, Pierson A, Balli F. Breathing Games Free/libre and open source games for respiratory health. **Exhibition at the Gamification & serious game symposium 2019;** Jul 24; Neuchâtel, Switzerland.
- Balli F. Breathing Games. **World Summit on the Information Society Forum; 2018** Apr 11, Geneva, Switzerland.
- Frangos N, Frangos M, Gervais Y, Balli F. Breathing Games – Une planète où chacun peut respirer librement. **50e anniversaire de la Faculté de l'aménagement de l'Université de Montréal; 2018** Oct 26; Montreal, Canada.
- Balli F et al. Des jeux pour souffler ? Game jam Breathing Games. Series of five posters. **OpenGeneva Festival; 2018** Apr 15; Geneva, Switzerland.



