Breathing Games
Synthesis 2014 – 2018

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Acknowledgements

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In a nutshell

Breath is life. Knowledge about respiratory health can help make split second, life saving decisions. Today, one person in five is affected with a chronic respiratory disease.

Breathing Games encourages everyone to take care of respiratory health with play. We experiment how a population can reclaim their health by collectively creating ludic technologies, and sharing them so that everyone can reproduce and improve them.

We create an open access commons – collectively managed resources that can be used and enriched by everyone – by bringing together game designers, developers, visual artists, engineers, musicians, medical care professionals, and other passionate people.

Breathing Games is a global initiative hosted by the Breathing Games Association (Switzerland).

Facts and figures

- 250 professionals and researchers mobilized across four countries
- 7500 hours of contributions
- 30 scientific communications
- 12 media interviews including the documentary A new Economy
- 300 K research funds and donations received
- 14 co-creation events organized
- 17 games prototyped
- 3 game controllers prototyped

Key supporting organizations

- Canadian Institutes of Health Research, Ottawa
- Concordia University, Montreal
- French Hospitals Federation – Research & Innovation Fund, Paris
- Geneva Federation against Cystic Fibrosis, Geneva
- Geneva University Hospitals, Geneva
- Lift Events, Geneva
- Necker & Cochin University Hospitals, Paris
- Quebec University Hospital, Quebec
- Sainte-Justine University Hospital, Montreal
- Sensorica Open Innovation Lab, Montreal
- Sustainability Action Fund, Montreal
- Swiss Game Center, Fribourg
- University of Applied Sciences Western Switzerland, Neuchatel
- WeMake, Milan
2018

This year, we finalize seven games – Asthmonautes, Respi Heroes, LungLauncher, Bloïd, PeakFlow, PeakLeap and TikiFlow, see page 8 – that will be tested by children between November and February 2019.

Co-creation events
– Apr 12-15  Game jam, OpenGeneva Festival, Geneva

Communications
– Oct 12  Poster, Canadian Arts Therapy Conference, Montreal
– Aug 31  Poster, meeting of WHO respiratory alliance, Helsinki
– Jan 13  Presenting to the research collective OMNSH, Paris
– Apr 3  Webinar at McGill University Game Lab, Montreal
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Location</th>
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<tr>
<td>Feb 18-19</td>
<td>Game jam</td>
<td>Concordia U, Montreal</td>
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<td>Mar 1-3</td>
<td>Game jam</td>
<td>Lift:Lab, Geneva</td>
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<td>May 25-26</td>
<td>Workshops on blockchain</td>
<td>C2 Mtl, Montreal</td>
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<td>Jun 3-10</td>
<td>Game jam</td>
<td>Concordia U, Montreal</td>
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<td>Jun 21-Jul 8</td>
<td>Maker in residence OpenCare, WeMake, Milan</td>
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<tr>
<td>Nov 30-</td>
<td>Keynote and workshops Collaborate and learn/teach</td>
<td>differently, Concordia U + CHU Sainte-Justine, Montreal</td>
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<td>Dec 2</td>
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### Communications

<table>
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<tr>
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<td>Mar 24</td>
<td>Presentation, Global Goals Innovation Day, Geneva</td>
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<td>Mar 25</td>
<td>Presentation, Oxford U Global Challenge, Calgary</td>
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<td>Apr 12</td>
<td>Presentation, European Academy of Design, Rome</td>
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<tr>
<td>May 10-12</td>
<td>Presentation and posters, ACFAS congress, Montreal</td>
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<td>Oct 6</td>
<td>Presentation on game jams, Lausanne U, Lausanne</td>
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<td>Oct 20</td>
<td>Presentation, OpenVillage Festival, Brussels</td>
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<td>Nov 3</td>
<td>Panel, <em>Canadian Science Policy Conference</em>, Ottawa</td>
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<td>Nov 9</td>
<td>Poster, meeting of WHO respiratory alliance, Brussels</td>
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breathinggames.net – 4
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.

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
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 first prototype, a preliminary study is realized with ten children at Sainte-Justine hospital. The team is 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

Respi Heroes
Health promotion and care
30 minutes, computer
Actively developed

Asthmonautes
Prevention and treatment of asthma crises
30 minutes, computer
Actively developed

LungLauncher
Prevention of asthma crises
4 minutes, smartphone
Actively developed

PeakFlow
Self screening of lung capacity (peak flow)
3 minutes, smartphone with game controller
Prototyped

PeakLeap
Self screening of lung capacity (peak flow)
3 minutes, smartphone with game controller
Prototyped

TikiFlow
Self screening of lung capacity (peak flow)
3 minutes, smartphone with game controller
Actively developed
Heritages
Airway clearance for cystic fibrosis
5 minutes, computer with pressure sensor
Actively developed

Les aventures du Briand
Airway clearance for cystic fibrosis
5 minutes, computer with pressure sensor
Discontinued

RollABall
Airway clearance for cystic fibrosis
3 minutes, computer with pressure sensor
Discontinued

Bloïd
Breathing exercise for stress reduction
3 minutes, computer with pressure sensor
Actively developed

PocBreath
Breathing toy
Smartphone with microphone
Actively developed

Pulmination
Removing allergens
3 minutes, smartphone
Discontinued
Globule
Airway clearance for cystic fibrosis
4 minutes, computer with pressure sensor
Discontinued

Ange-Gardien
Airway clearance for cystic fibrosis
5 minutes, computer with pressure sensor
Discontinued

PEP Hero
Airway clearance for cystic fibrosis
3 minutes, computer with pressure sensor
Discontinued

Pulmo
Respiratory health awareness
2-20 minutes, smartphone
Actively developed

BreathingApp
Follow up in asthma
Smartphone
Discontinued
Game controllers

Test bed
Domestic, 3d-printed bluetooth device with pressure sensor, flowmeter and others
Direct use
Actively developed

3d box
Domestic, 3d-printed bluetooth device with pressure sensor
Use with traditional PEP
Prototyped

Sound-capture software library
Captures and analyzes the sound of a mouthpiece via a regular microphone set
Use with oscillating PEP and smartphone
Actively developed

“Knowing how we can start just from a group of people who is interested in building something together, each person bringing their own skills, is an amazing, eye-opening experience. We are coming together and working for a common goal, common values without having the same knowledge at the beginning, and we learn from each other. Having that collaboration is really key to developing any tool that will be useful for the patient at the end.”

Dr Sze Man Tse
Paediatric respirologist, Sainte-Justine university hospital
Publications

Scientific published articles


– Balli F. Lessons learned from the use of a participatory design process to develop digital games addressing airway clearance therapy in children with cystic fibrosis. JMIR Serious Games 2018. DOI: 10.2196/games.8964.

Scientific abstracts


Scientific presentations

– Balli F. Game jams to co-design respiratory health games in Canada and Europe. Webinar. Participatory Research at McGill Game Lab; Montreal; 2018 Apr 3. Onyoutu.be/lATVTHMIK8Q.

– Balli F. Commons and Breathing Games. General Assembly of Observatoire des Mondes Numériques en Sciences Humaines; Paris; 2018 Jan 13.


– Balli F, Dugas B. Everyone should be able to adopt (lifesaving) health innovation. Presented at OpenVillage Festival; Brussels; 2017 Oct 20. breathinggames.net/pub/bg_17_pres_openvillage.pdf.


– Balli Fabio. Ensuring Everyone’s Right to Respiratory Health: Participatory Research and Knowledge Co-Creation. INDI research day of Concordia University; Montreal; 2017 Mar 16.


Balli F. Health & Play – Mobilizing citizens around breathing autonomy. Forum social mondial; Montreal; 2016 Aug 3.


Scientific posters


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

Dr Stuart Brown
In Play: How it Shapes the Brain, Opens the Imagination, and Invigorates the Soul. Avery 2010.
Human rights principles

Since May 2016, Breathing Games is a signatory of the GlobalCompact. We commit to the principles of human and non-human rights and the right to do meaningful activities. The first article of the Declaration of Human Rights is essential to 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.

By aiming that health education and technologies are accessible to all, we align with the Global Goals: health for all (3) decent work (8), resilient infrastructure (9), reducing inequalities (10), and ensuring sustainable production patterns (12).

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

Free software and open-source hardware
We use tools which respect the users’ freedoms 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:

– riot.im for coordination between contributors
– GIMP for image edition
– LibreOffice for offline documentation

Copyfair licences
Instead of the traditional copyright, we use licences that preserve the right to reuse knowledge if reciprocity is provided:

– GNU Affero General Public License 3.0 (Free Software Foundation)
– Attribution-ShareAlike 4.0 International (Creative Commons)
– Open Hardware Licence 1.2 (CERN)
– Peer Production Licence (P2P Foundation)

Accessible documentation
We document the 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

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

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

A system of distributed data and token is being developed to ease participatory decision-making, encourage communities to develop local projects, and let individuals decide how their data are used.

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.

August 2018 – lead coordinator
Financial report

This report shows the funds invested in the commons by different entities. It does not take into account in-kind contributions.

Investments from third parties with use and manager

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Total 209'125
Acknowledgements

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Gareth Brown
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Béatrice Godot
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Viviana Gozzi
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Levan Jeanneret
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Typhaine Juvet
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Cem Koker
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Béatrice Langellier
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Aline Lustre
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Pascal Nataf
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Meggan Stephan
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