RYERSON UNIVERSITY

Ontario

Canada

Environmental Applied
Science & Management

A Happy Solution to Global Warming

Ching Lo, PhD

18 Nov 2015

Nalanda University Seminar

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Global warming not a dirty word anymore

- Jul 3, 2014 The Ontario Ministry of the Environment changed is name to Ministry of the Environment and Climate Change
- Federal Scientists from Environment Canada can say “Global Warming Climate Change” on national TV news broadcast global news 22Oct2015.mp4 1:50 min Senior Climatologist David Phillips
- The most powerful Catastrophic Category 5 Hurricane in Americas record “Patricia” Weather Channel 23Oct2015.mp4

Gaia – Goddess of Mother Nature

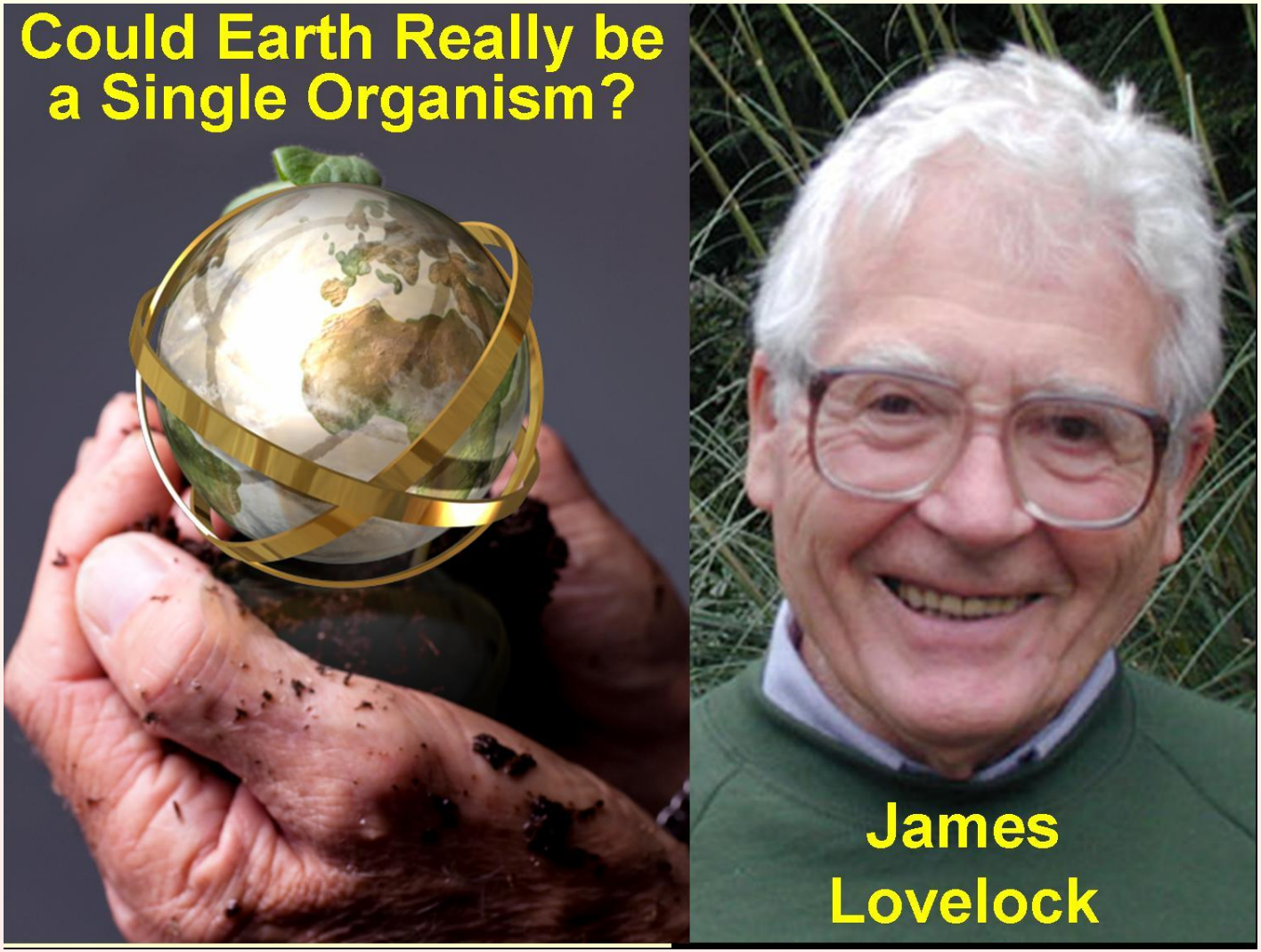
- hurricane satellite footage

http://www.youtube.com/watch?v=Z7F2kN1R_Ms

How Hurricane's DevelopHurricanes 101.mp4

- James Lovelock's Gaia Gaia Hypothesis.mp4
- https://www.youtube.com/watch?v=VjLC3GjFMv0

How can Environmental Scientists save the world?



Gaia: a new look at life on Earth, 1979

UN Declaration

"Feb 2, 2007 will be remembered as the date when uncertainty was removed as to whether humans had anything to do with climate change on this planet. The evidence is on the table"

Achim Steiner, executive director, United Nations Environment Program

Central Value System of the dominant civilization

Critical thinking: Root-causes of global warming

1. Humans pursue happiness
2. Happiness is an abstract quality
3. Humans do not know how to make consistent decisions based on abstract quality
4. Decisions are easy when based on quantity/number
5. Money (currency) is the only number available and universally recognized
6. People pursue money in their attempt to pursue happiness
7. Money translates into consuming power. Overconsumption demands over-production, creates wastes, depletes natural resources, pollutes the environment and causes global warming (rising sea level, climate change, flood, water shortage, food shortage, diseases, socioeconomic collapse)

CONCLUSION: Find a quantifiable measurement of happiness (HI) as an alternative value system to money

VISION : Create a new science to establish a new value system alternative to money

The real solution to change the central value of the dominant civilization is to provide an alternative, quantifiable measurement of happiness, a “Happiness Index”

2011 United Nations Resolution 65/309 calls for establishing a means to measure happiness http://uncsd.iisd.org/news/un-secretary-general-calls-for-gross-global-happiness-as-a-measure-of-sustainable-development/

Recognition of Happiness Index idea

- 11Dec97 Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) adopted by EU and 191 states; USA, Canada opted out.
- 16Feb2005 greenhouse gases reduction enforced.
- “Earth Hall of Fame” was established to the right side of the lobby at the main entrance of the convention center.
- 2009 the first inductee was the Bhutan's former King Jigme Singye Wangchuck, photo first in line in the Hall. His happiness idea recognized after ~40yrs

Evolution of “Happiness Index”
first-generation

1972 Bhutan's 4th King Jigme Singye Wangchuck proposed gross national happiness (GNH) concept to supplement the gross domestic product (GDP) concept {religion + political/social science + economics}

Earth Hall of Fame, Kyoto 2009

7 Primary factors used to measure "Happiness" 1st-generation method

1. Physical and Mental Health
2. Time Balance
3. Social and Community Vitality
4. Cultural Vitality
5. Material Standards
6. Quality of Governance
7. Environmental Vitality

37 pages long survey

1st-generation Example #1

The Greater Victoria Well-Being Survey 2009

- Dr. Michael Pennock, epidermiologist, Vancounver Island Health Authority.
- Funded by Victoria Foundation, B.C.
- 2400 random residents in Greater Victoria returned survey
- high level of wellbeing (7.6/10), similar to Canadian average (7.7).
- 2007-2009 Canada consistently ranked among the top five of nations.
- The idea of “self reported happiness and life satisfaction” is becoming an accepted concept.

1st-generation Example #2

- International Conference on GNH, 4-6 November 2015
- Centre for Bhutan Studies & GNH Research
  http://www.bhutanstudies.org.bt/high-level-meeting/ Report

Evolution of “Happiness Index” second-generation

2006 a second-generation GNH concept by Med Jones, the President of International Institute of Management

Treat happiness as a socioeconomic development metric

7-parameters of 2nd-generation GNH by direct survey & statistical measurement of respective matrics

1. **Economic Wellness**: economic metrics such as consumer debt, average income to consumer price index ratio and income distribution
2. **Environmental Wellness**: environmental metrics such as pollution, noise and traffic
3. **Physical Wellness**: physical health metrics such as severe illnesses
4. **Mental Wellness**: mental health metrics such as usage of antidepressants and rise or decline of psychotherapy patients
5. **Workplace Wellness**: labor metrics such as jobless claims, job change, workplace complaints and lawsuits
6. **Social Wellness**: social metrics such as discrimination, safety, divorce rates, complaints of domestic conflicts and family lawsuits, public lawsuits, crime rates
7. **Political Wellness**: political metrics such as the quality of local democracy, individual freedom, and foreign conflicts

Implementation of the 2006 2nd-generation GNH Government Intention

- http://www.guardian.co.uk/lifeandstyle/2010/nov/14/happiness-index-britain-national-mood
- National Post Tue Nov 16, 2010

2010 GNH Rank

1. Denmark
2. Finland
3. Norway
4. Sweden
4. Holland
6. Costa Rica
6. New Zealand
8. Canada
8. Israel
8. Australia
8. Switzerland
14. USA
17. Britain
44. France
70. Taiwan
81. Hong Kong
125. China

A18 國際新聞 INTERNATIONAL NEWS 2010年11月16日 星期二 星島日報 SINGTAO DAILY

卡梅倫出新招 評估民心取向

英擬設「快樂指數」助施政

經濟增長是否與國民的快樂成正比？英國首相卡梅倫的答案是否定。 本報訊

英國政府將設立「快樂指數」（happiness index），來評估國民心理健康和環境安適狀況，卡梅倫會把這項指數作爲未來決策的核心考量。實行後，英國可成爲首批正式監測人民整體快樂程度的國家之一。

英國《衛報》報道，首相卡梅倫（David Cameron，小圖）要求國家統計局（Office of National Statistics）草擬衡量國民「總體幸福」的方法，但確實推行時間未有定案。英國政府消息人士稱：「這樣做的目的是要製作一套新的數據資料，並定期公布，以評估英國人民心理上和身體上的幸福。這種評估將包含客觀的衡量標準，例如全國共做了多少腹物回收，又可對人民的心理和態度有主觀的評價。」

倡明春實行 每季公布

報道說，卡梅倫將把這項指數作爲未來制定政策的核心參考。可是，在英國政府剛宣布大減公共預算的背景下，「快樂指數」的量度結果可能令政府尷尬。

卡梅倫政府將會在本月25日的會議上，要求國家統計局局長馬西森（Jil Matheson），在明年春季的住户統計調查時，加入新增的有關快樂指數的問題。雖然馬西森可以決定加入甚麼問題，但政府的目的是想定期取得人民對其主觀幸福感的回應，其中包括快樂程度，以及人民對達成人生目標的主觀感受。

政府消息說，新的數據將每個季度公布一次，就像英國事業調查數據一樣。

加拿大亦研指數可行性

加拿大亦正研究設立「快樂指數」的可行性，法國總統薩爾科齊去年就宣布打算以快樂的水平，作爲評估國家經濟發展的方法之一；英國已就民衆對生活的滿意程度進行調查，但正式監測民衆的快樂情況則未見。

諾貝爾經濟學家斯蒂格利茨（Joseph Stiglitz）和阿馬蒂亞·森（Amartya Sen）呼籲全球領袖不要再以國內生產總值（GDP）的傳統經濟觀念，作爲幸福和持續發展的考量，應該更多考量家庭財富，更要評估國家是否持續發展抑或破壞環境。

圖無憂無慮的丹麥小朋友。 本報資料圖片

「你有多快樂？」

英國衡量快樂可能包括以下問題：

1. 你對你的生活有多滿足？0分最低，代表「完全不滿足」；10分最高，代表「完全滿足」
2. 整體而言，你昨天感到多快樂？
3. 你有多少個人生目標？
4. 在工作場所和家中，男女是否獲得平等對待？

英國《衛報》

倫敦特拉法加廣場前年舉行英國奧運英雄勝利遊行，一片歡樂氣氛。 本報資料圖片

最快樂國家/地區

1	丹麥	8	澳洲
2	芬蘭	8	瑞士
3	挪威	14	美國
4	瑞典	17	英國
4	荷蘭	44	法國
6	哥斯達黎加	70	台灣
6	新西蘭	81	香港
8	加拿大	125	中國
8	以色列		

資料來源：普洛普調查

北歐五國最快樂

根據蓋洛普民調機構長達4年調查，世界最快樂的國家前五名是丹麥、芬蘭、挪威、瑞典和荷蘭（並列第四），這五個國家都屬於北歐地區，並同樣國家繁榮。然而，調查也發現雖然金錢重要，但金錢不能保證必然快樂。

這項調查在2005年至2009年進行，訪問了155個國家和地區逾13.6萬人，調查受訪者對生活整體滿意程度，然後再就之前一天連串生活經驗例如休息是否足夠、是否感到受尊重、危急時有否親友可依等評分，再以國家快樂人口比率爲各國排名。

調查顯示，金錢對快樂程度有重要影響，但人擁有成就感以及對前途充滿希望也是快樂的主因。以哥斯達黎加爲例，在全球快樂指數中排名第六，比全球收入最高的美國（排14）還高，主因是其社會網絡穩固人際關係良好，能夠滿足現狀而不受財政狀況影響。

經濟諾獎得主：執著增長致「災難」

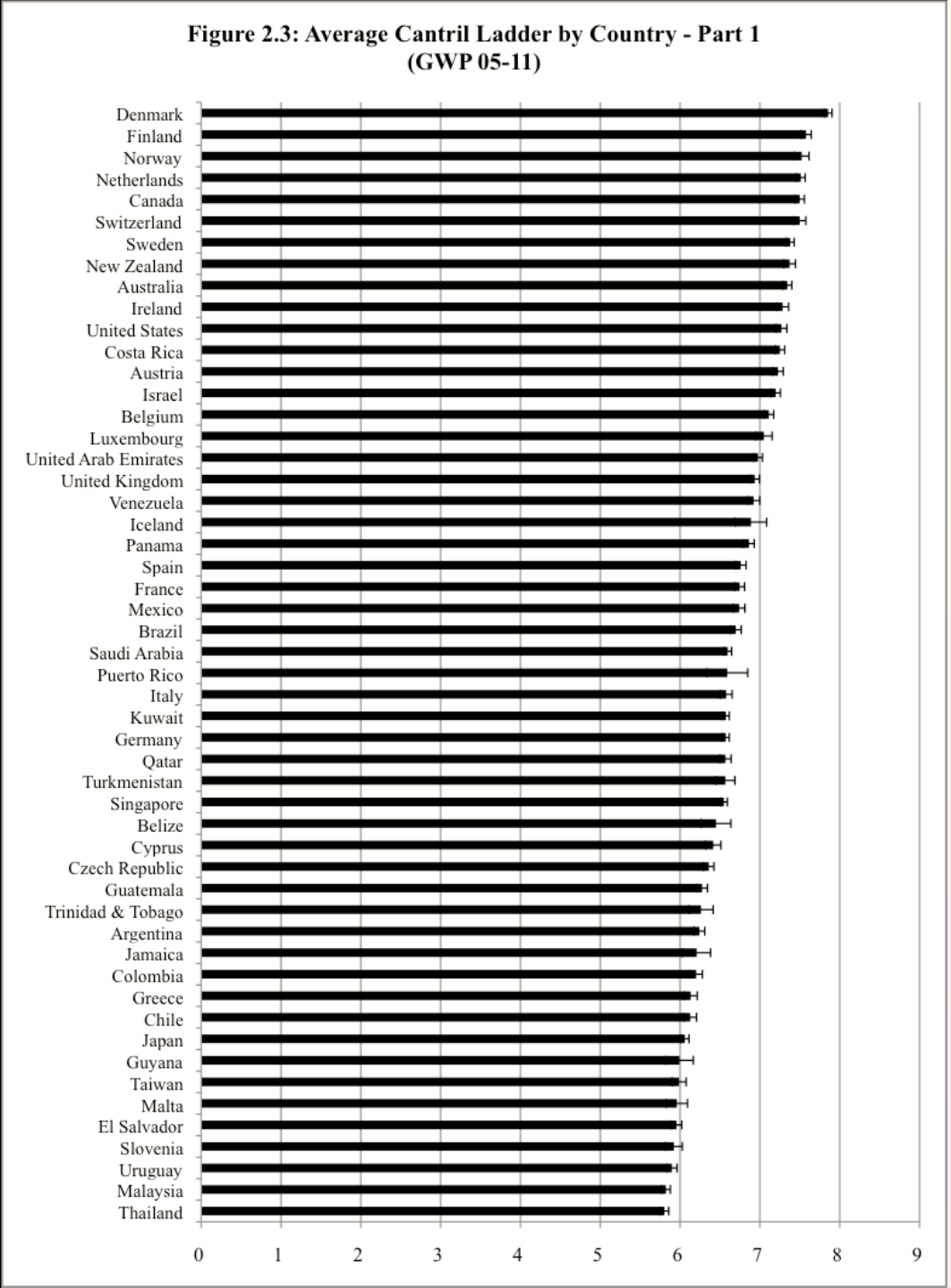
兩人去年受英國總統薩爾科齊委託，在傳統的經濟衡量工具外，尋找另類方法測量經濟健全程度。報告指以國內生產總值（GDP）作單一測量工具有不足之處。各國政府對此過分執著，使國民失業的社會成本和環境受破壞對公衆健康的影響常被忽略，更甚的是政府因此容許銀行過分借貸，最終導致金融大災難。《紐約時報》報道，兩位經濟學家闡明，這套只重視經濟發展的經濟哲學只會帶來不快樂，主張典型人士的收入數據比整個社會的生產總值更應受重視。兩人建議用快樂程度、生活質素及收入分配來衡量整體經濟成功程度。

Implementation of the 2006 2nd-generation GNH Academia / Private Sector

Two schools

1. "World Happiness Report 2012/13" Jeffrey D. Sachs: director, the Earth Institute, Columbia University, New York
2. "Happy Planet Index (HPI) 2012/15" New Economic Foundation, UK

$$\text{Happy Planet Index} \approx \frac{\text{Experienced well-being} \times \text{Life expectancy}}{\text{Ecological footprint}}$$



World Happiness Report 2012 by the Earth Institute, Columbia University

P.31

http://www.earth.columbia.edu/sitefiles/file/Sachs%20Writing/2012/World%20Happiness%20Report.pdf

1 Denmark

2 Norway

3 Finland

4 Netherlands

5 Canada

11 USA

18 UK

Happy Planet Index hpi-data2015.xlsx

Rank	2012	2015
1	Costa Rica	Costa Rica
2	Vietnam	Vietnam
3	Colombia	Jamaica
4	Belize	Belize
5	El Salvador	Indonesia
6	Jamaica	El Salvador
7	Panama	Colombia
8	Nicaragua	Bangladesh
9	Venezuela	Panama
10	Guatemala	Cuba

http://en.wikipedia.org/wiki/Happy_Planet_Index

- 2012 Ranking 151 countries
- 9/10 top countries are in the Caribbean Basin, despite high levels of poverty.
- Costa Rica is top, second time in a row, due to its very high life expectancy which is second highest in the Americas, and higher than the U.S., experienced well-being higher than many richer nations and a per capita footprint 1/3 the size of the U.S.
- Among the top 40 countries by overall HPI score, only 4 countries have a GDP per capita of over US$15,000

Shortcomings of the 1st & 2nd - generation "Gross National Happiness"

(1) Different measurement methods return very different results. HPI calculates the ecological footprint cost for happiness.

(2) The questionnaire surveys are qualitative, subjective, opinionated and culturally influenced

(3) Uncontrollable bias in sampling is highly probable, especially 1st-generation method

(4) The GNH result does not motivate or empower individual participants surveyed

Third-generation scientific solution is proposed

- A response to the United Nations Resolution 65/309, 2011, which calls for establishing a means to measure happiness despite 1st & 2nd generation methods already exist.
- To quantify happiness using reliable and reproducible laboratory analysis of human body metabolites combined with physiological and psychological measurements.
- Ching Lo (2010) Global Warming: Realities, Root-cause Analysis, and a Happy Solution.

  eBook ISBN: 978-0-9867943-1-5.
  http://www.amazon.com/Global-Warming-Realities-Root-cause-ebook/dp/tags-on-product/B003XKNDY4

Happiness/Stressor Measurements

- Conventional techniques
  - Subjective Evaluation
    - Psychological self assessment
  - Objective Evaluation
    - Questionnaire assessments by social circle
    - Lie detector, heart beat rate, skin conductivity, perspiration, respiration.
    - Nuclear magnetic resonance imaging (MRI), CT scans
    - Infrared Spectrum
- Proposed objective laboratory technique – Metabolomics

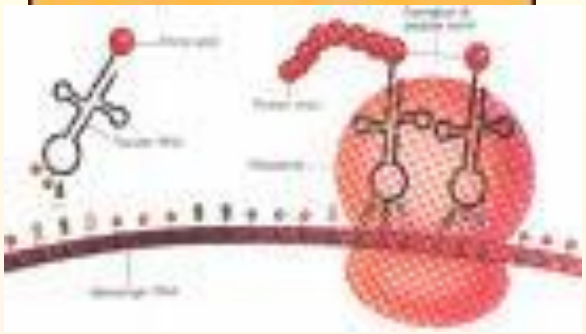
Experimental Methodology

- **Working hypothesis**: The psychological state of happiness may be related to the physiological state, which in turn may be represented by a specific collection of metabolites.
- **Method**: Use mass spectrometry to discover metabolomic profiles discerning unhappy (psychiatric) groups from happy control groups.

DNA
Genomics

25 thousand Genes

RNA
Transcriptomics

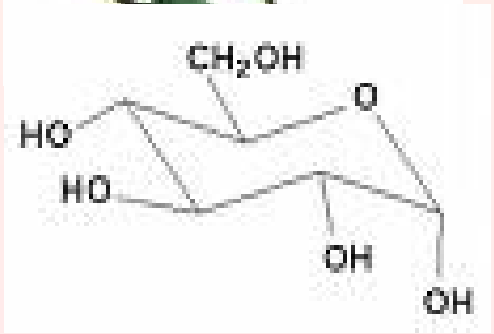


100 thousand Transcripsts

Proteins
Proteomics

1million Proteins

Metabolites
Metabolomics

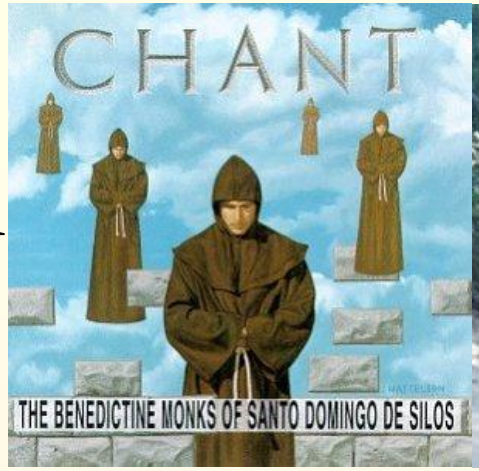


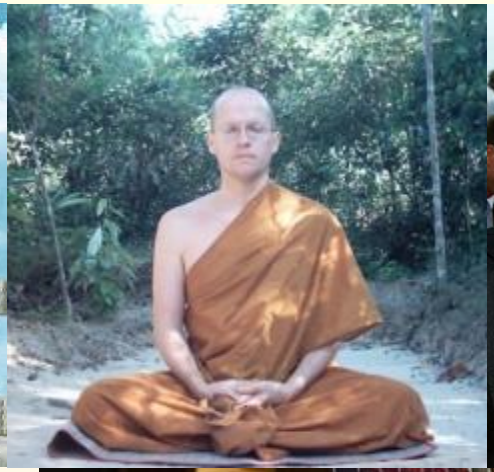
<2,000 compounds

Metabolomics Lab

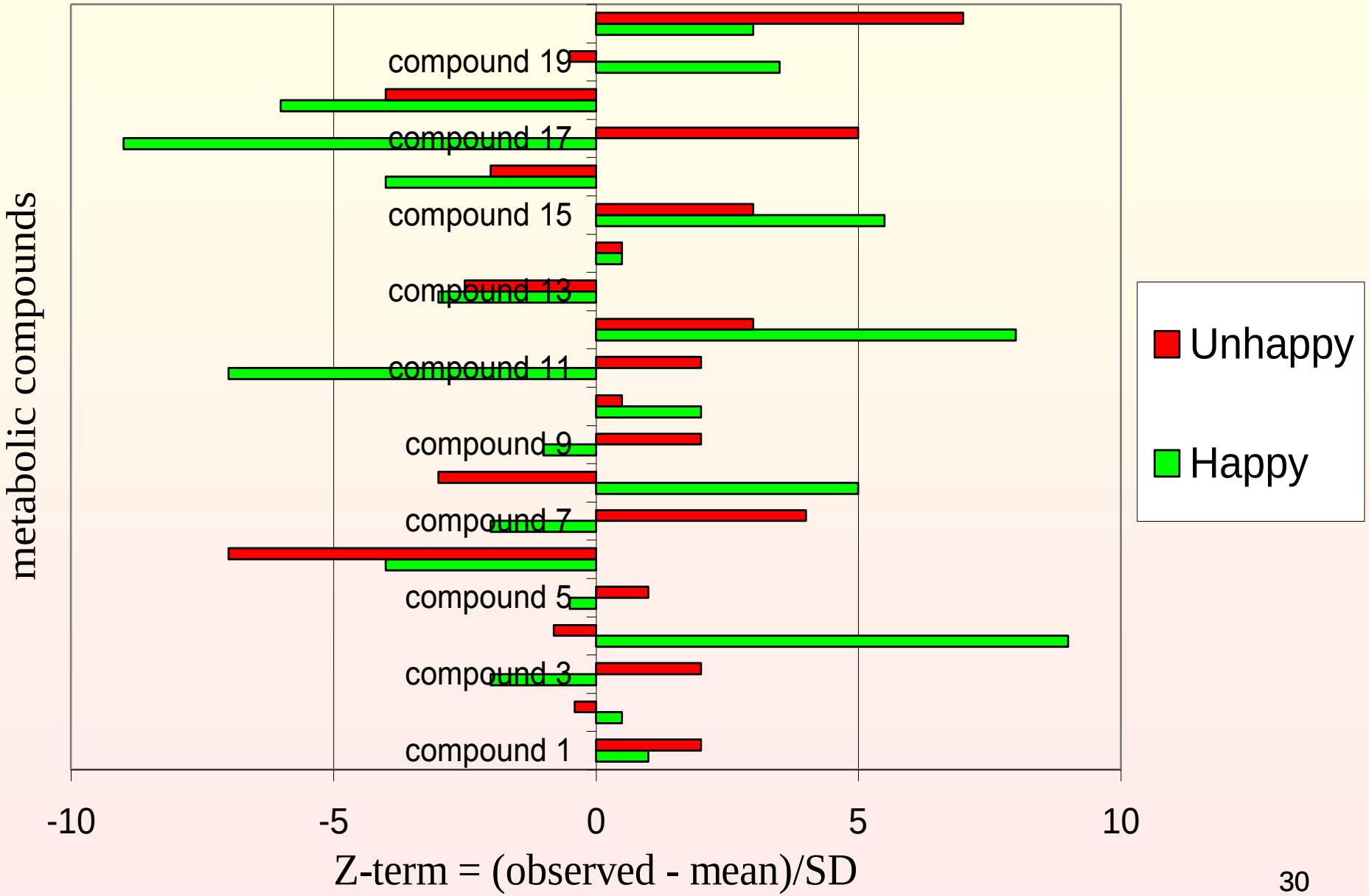
Subject Categories

10. Spiritual
9. Rich retired
8. Optimists
7. Celebrities
6. Financier
5. Average Joe
4. Poor people
3. Manic d
2.Suicidal
1. War vet





Hypothetical Metabolomic Profiles

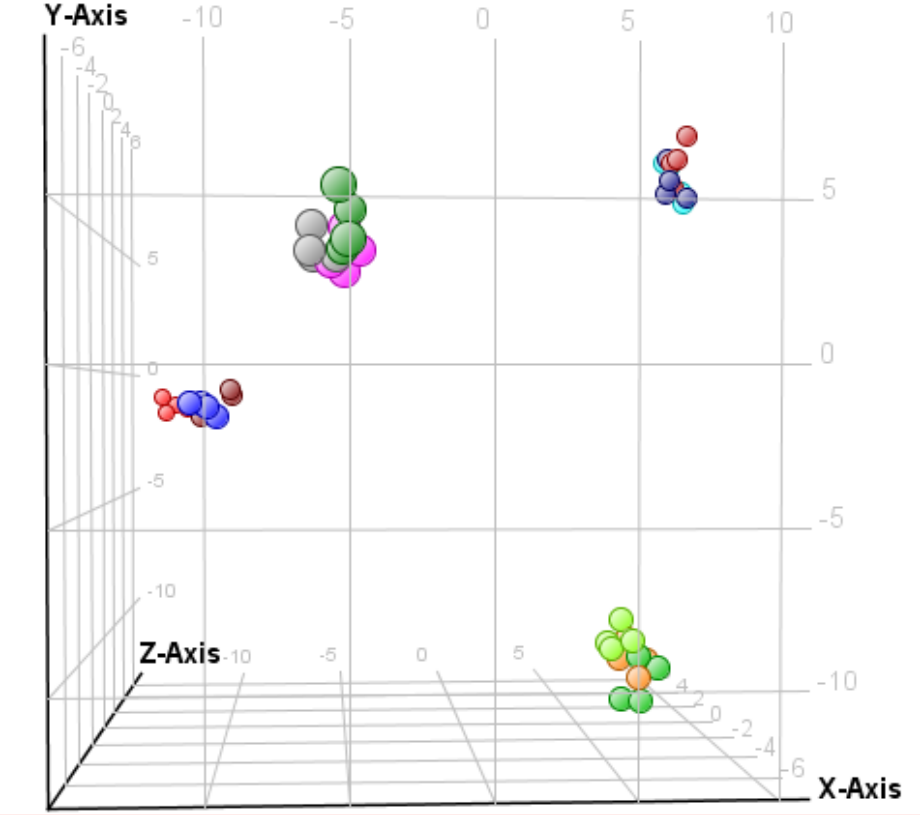


large molecule feature extraction software can detect and deconvolute the intact proteins followed by multivariate statistical analysis software to provide clustering and Principal Component Analysis

Four different strains of the same bacteria species distinguishable by proteomics/metabolomics

A1, A2 *Salmonella typhimurium*

A39, A40 *Salmonella Heidelburg*



X, Y and Z Axis represent deconvoluted protein masses, summed abundances of all the charge states reflecting those masses, and corresponding retention times

Metabolomics Test subjects

- Survey respondents pool provides stratified groups according to self-reported happiness strata
- They become logical test subjects for metabolomics profiling
- To find correlation between Happiness Index with group Metabolomics profiles

Nature of Happiness Index

- **Is:**
  - Objective
  - Neutral
  - Informative
  - Incentive
- **Is not:**
  - Confrontational
  - Dogmatic

Function of the Happiness Index

- **Will:**
  - Measure the well being of society
  - Entice and guide policy makers
  - Redefine quality of life
  - Help individuals to make lifestyle choices in the short and long term
  - Be a powerful alternative to the mighty dollar. and other economic indexes
- **Will not:**
  - Be tradable
  - Be falsify

Conclusions

1. Third-generation approach to create quantifiable "Happiness Index" is technically feasible.
2. This represents the evolution of human collective consciousness.
3. Scientific approach to religion (nirvana research) brings Science and religion together.
4. Spiritual value system to change materialistic social values
5. Changing human behaviour to save the planet

Natural Sciences and Engineering Research Council of Canada | Conseil de recherches en sciences naturelles et en génie du Canada

MESSAGE TO APPLICANT MESSAGE AU CANDIDAT

This message represents the consensus opinion of the committee that reviewed your Letter of Intent. Ce message reflète le consensus de l'opinion du comité qui a examiné votre Lettre d'Intention.

Applicant's Name, Appl. ID, Institution / Nom de famille, numéro de la demande, établissement du candidat Ching Yee Lo, 448498-2013, Ryerson

Type of Grant / Genre de subvention

Discovery Frontiers - Advancing Big Data in Genomics Research / Frontières de la découverte - Avancement de la science des données volumineuses appliquée à la recherche en génomique

Application Title / Titre de la demande

Creation of happiness indices based on metabolomic profiling

The committee provided the following comment regarding your Letter of Intent/ Le comité à fourni les commentaires suivants concernant votre Lettre d'Intention :

The LOI from Ching Yee Lo and colleagues proposes metabolomic profiling of psychiatric patients and normal controls with the goal of identifying metabolic signals that correlate with reported happiness based on a survey instrument. The proposal was considered very innovative, but also extremely risky given the potential for a high degree of confounding (schizophrenics taking psychoactive medication, issues with an imprecise measure of happiness) and an apparent lack of preliminary data. While the review panel felt that this was not yet suitable for a large-scale, big data proposal, there was consensus that this could make an excellent pilot grant application to establish the feasibility of a larger study.

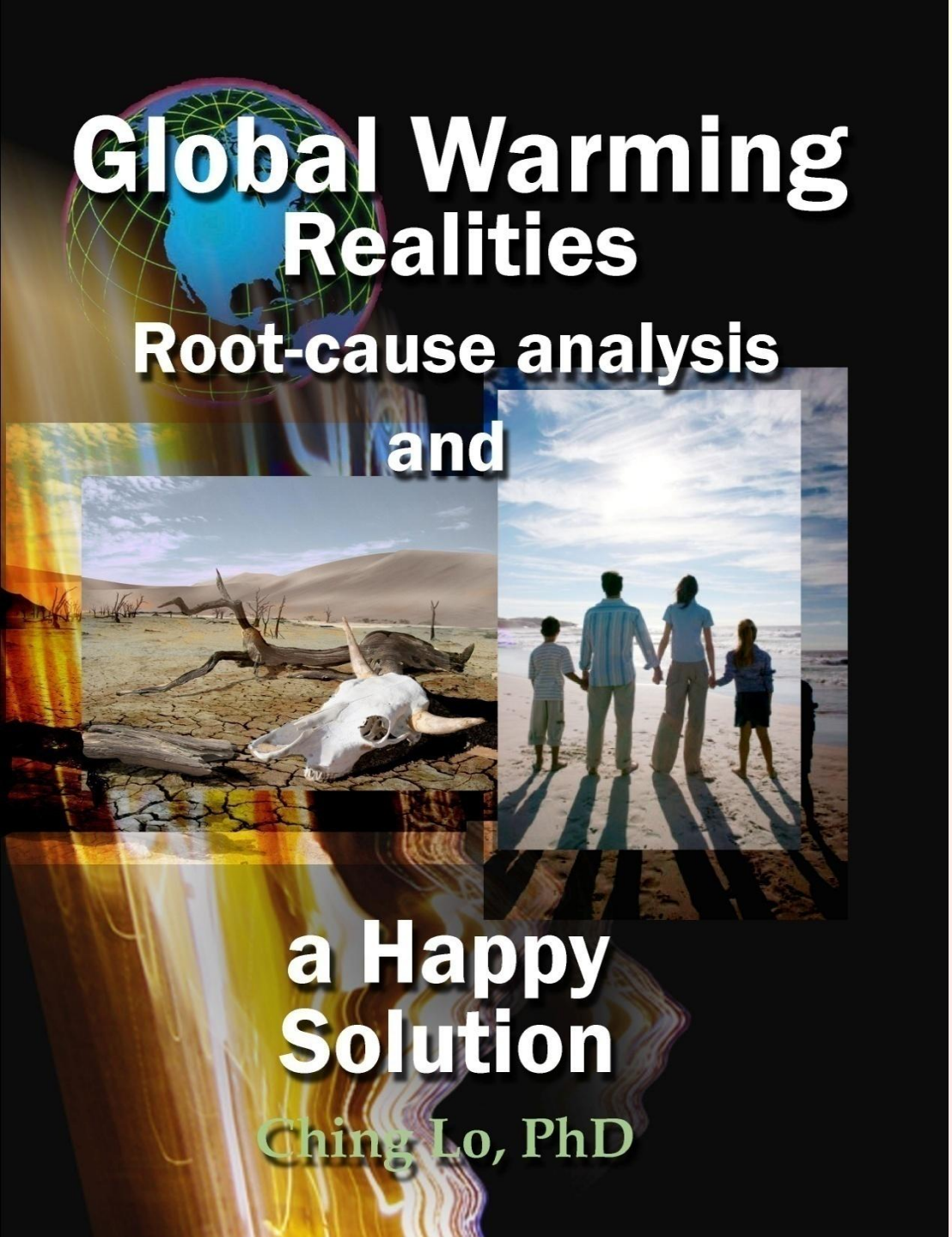
2015-16 Ryerson University Dean's Research Funds

1) Booster Fund
2) Tools Fund
3) Student Research Experience Fund

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.

Margaret Mead

US anthropologist (1901 - 1978)



http://www.amazon.com/Global-Warming-Realities-Root-cause-ebook/dp/tags-on-product/B003XKNDY4
$7.95

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- Audience Nalanda University

http://www.filmsforaction.org/watch/the_11th_hour/

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Thank You