EFMA
22 June 2021

Sophisticated Predictive Analytics
for Hedge Funds and Institutions

HedgeSPA

www.hedgespa.com

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ALL-STAR TEAM

Founders

FOUNDER/CEO: BERNARD LEE, PHD, CFA

Award winning former MD at BlackRock

... professor

Appeared on BBC, Forbes, C...

PRINCETON UNIVERSITY · Stanford University · BlackRock · Imperial College London · Evolving Roles of Sovereign Wealth Managers After the Financial Crisis: Past, Present and Future – Bernard Lee · ia≠ai

CO-FOUNDER/CTO: CHIN HOCK KUA, PHD

Accomplished A*STAR scientist

SMART – Singapore-MIT Alliance for Research and Technology · Agency for Science, Technology and Research SINGAPORE · ICE – Global markets in clear view

Advisors

- **Senior Advisor:** Former MD of Agency for Science, Technology and Research SINGAPORE; Senior Advisor, south pole
- **Academic Advisor:** Professor, Imperial College London; Fellow, ROYAL ACADEMY OF ENGINEERING; Chavalier (Knight) and Officier, AMOPA

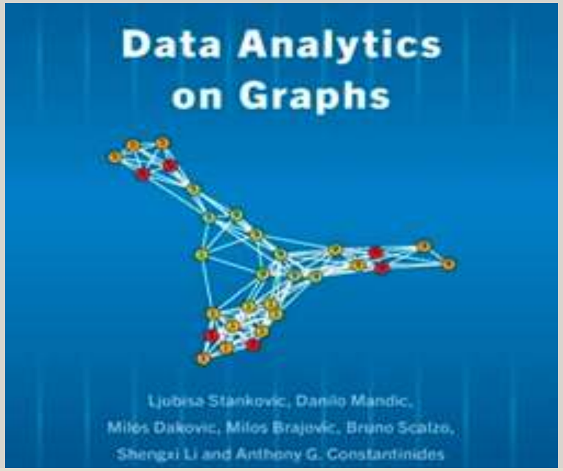
Team

- **Pedigree**: Award-winning BlackRock **Aladdin Multi-asset** functionalities
- **Seeder:** Singaporean **Prime Minister's Office**, based on Founder's background IP from PhD dissertation
- **Team:** Former BlackRock team who built up Asia presence; Proven private bankers / inst'l sales

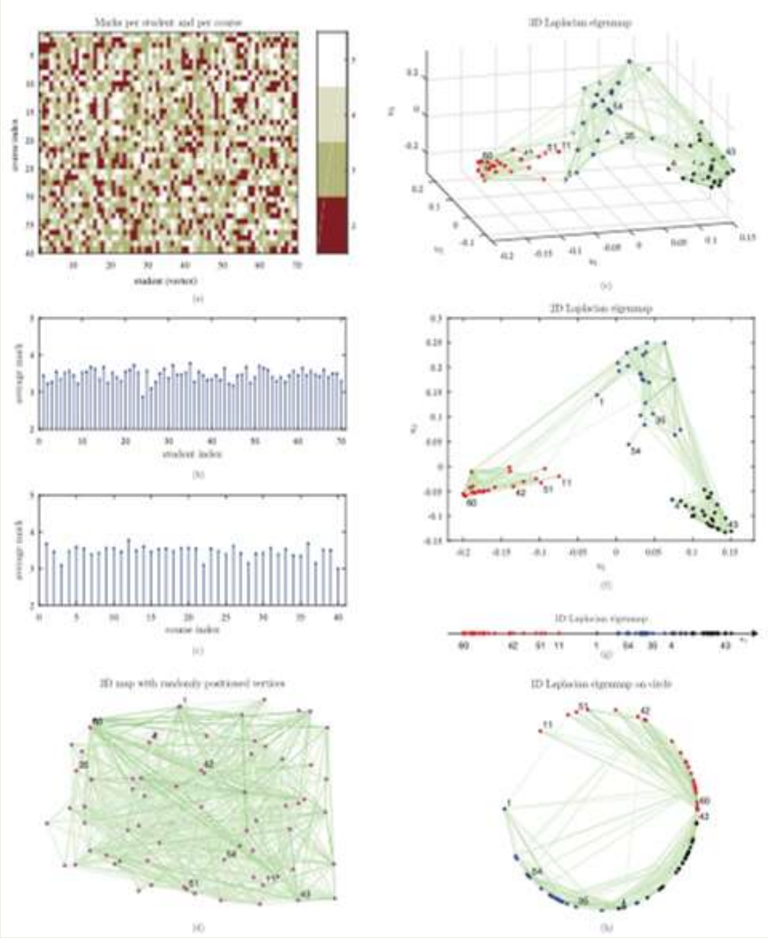
WHY SO MUCH INTEREST IN WHAT WE DO?

Graph Theory

- Published by Google as techniques for computing "page rank"
- Compressing massive structured and unstructured data into a "rank", similar to what money managers do
- Requires massive scale: e.g. Portfolio Cuts on supercomputers

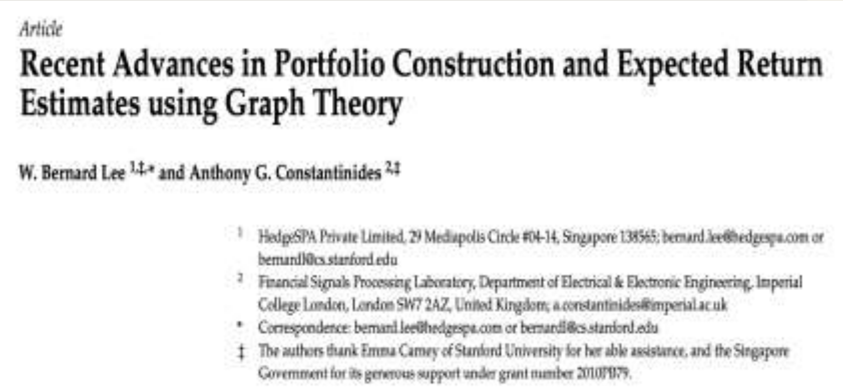


Dimensional Reduction of High-Dimensional Data



Advisors

- Professor and Co-director of Financial Signals Processing Lab at Imperial College London Electrical Engineering
- MAS-supported exec education in collaboration with HedgeSPA
- R&D outputs to present @ International Conference on Time Series and Forecasting (Springer proceedings) and Annual Meeting of the American Statistical Association.



Article

Recent Advances in Portfolio Construction and Expected Return Estimates using Graph Theory

W. Bernard Lee [1,†,*] and Anthony G. Constantinides [2,‡]

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2 Financial Signals Processing Laboratory, Department of Electrical & Electronic Engineering, Imperial College London, London SW7 2AZ, United Kingdom; a.constantinides@imperial.ac.uk
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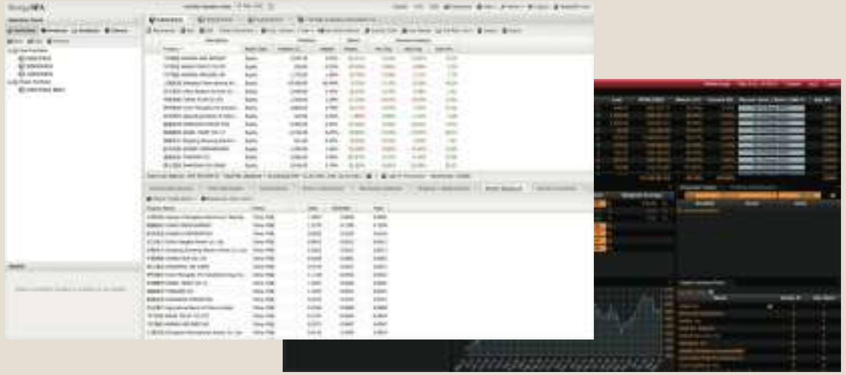
‡ The authors thank Emma Carney of Stanford University for her able assistance, and the Singapore Government for its generous support under grant number 2010PB79.

BECAUSE OF OUR 3 STATE-OF-ART INVESTECH SOL'NS



Enterprise Application + Dashboard

- Enterprise App Similar to BlackRock Aladdin
- Dashboard Mostly View Only, similar to BlackRock Green Package
- Integration in Bloomberg App Store
- More than 5 users, **Firmwide** or Division-wide

Terminal

- Self-Contained, Simple On-Boarding, **Zero Integration**
- Tiered Pricing Model based on Data from SIX (Swiss Exchange)
- Similar to Bloomberg PORT or Bloomberg AIM, but most such solutions depends on "upstream position daily feeds"
- Broken upstream feed = No P&L

API Solution

- Can handle Alternative Data and meet Regulatory requirements
- Full cloud engine that can be customized (backend API Engine – **OAUTH2** password based now + Swiss-German Single Access Key)

GLOBAL INVESTECH WHO'S WHO

PLUS OUT-PERFORMING INVESTMENT STRATEGIES

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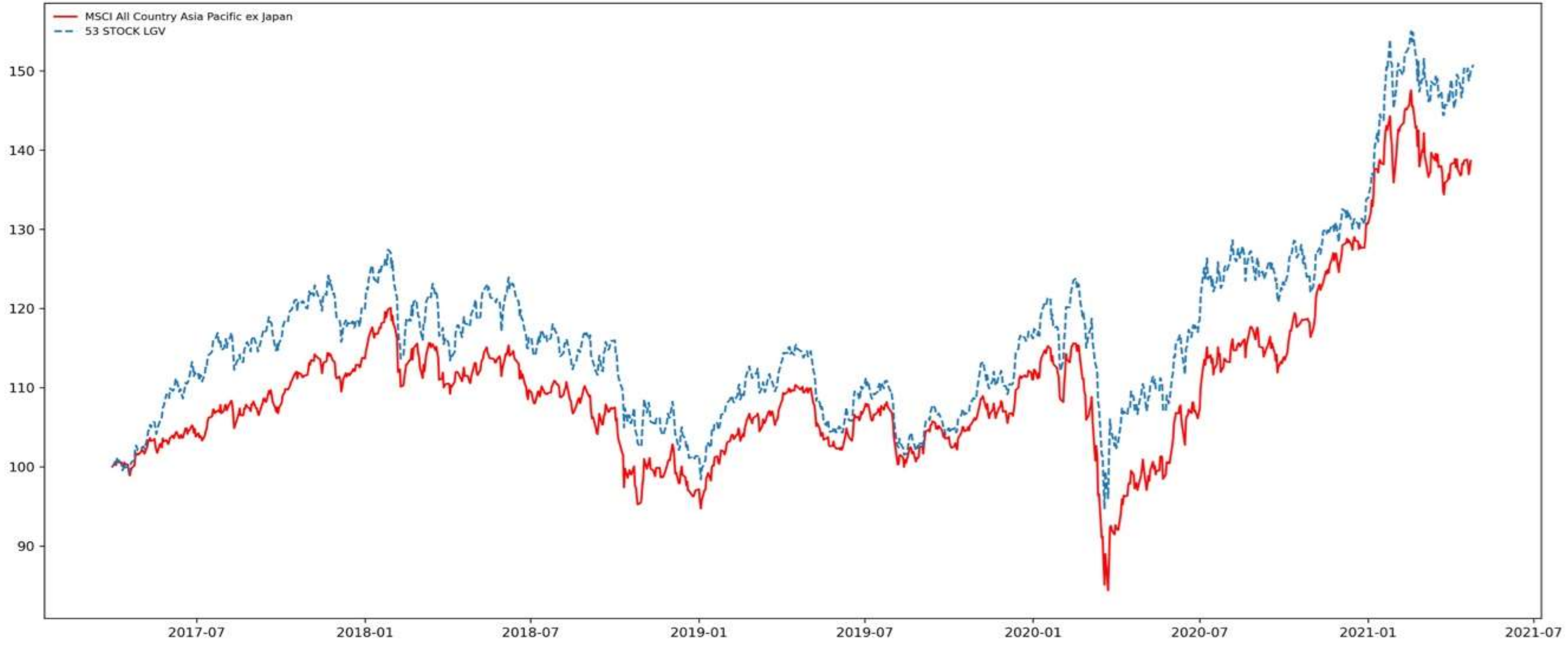
Independently Verifiable Out-Performance Track Record of Enhanced Asia Pacific Ex-Japan (AAXJ - No leverage, No Sector/Country Bias)

CUMULATIVE INDEX PERFORMANCE – RETURNS(SGD)(2017-03-31 - 2021-04-26)



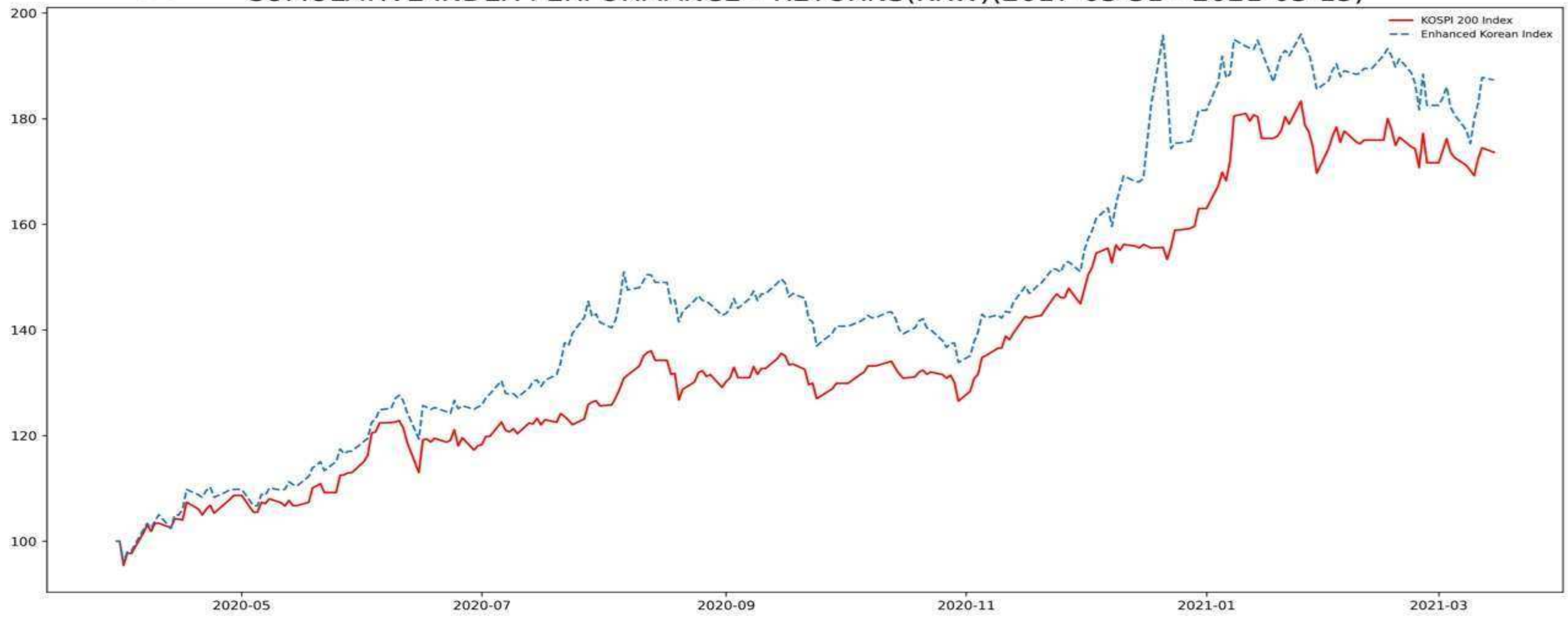
PROVEN IN MULTIPLE MARKETS E.G. KOREA

HedgeSPA

www.hedgespa.com

Independently Verifiable Out-Performance Track Record of Enhanced KOSPI 200 (No leverage, Sector Bias under Investor Constraints)

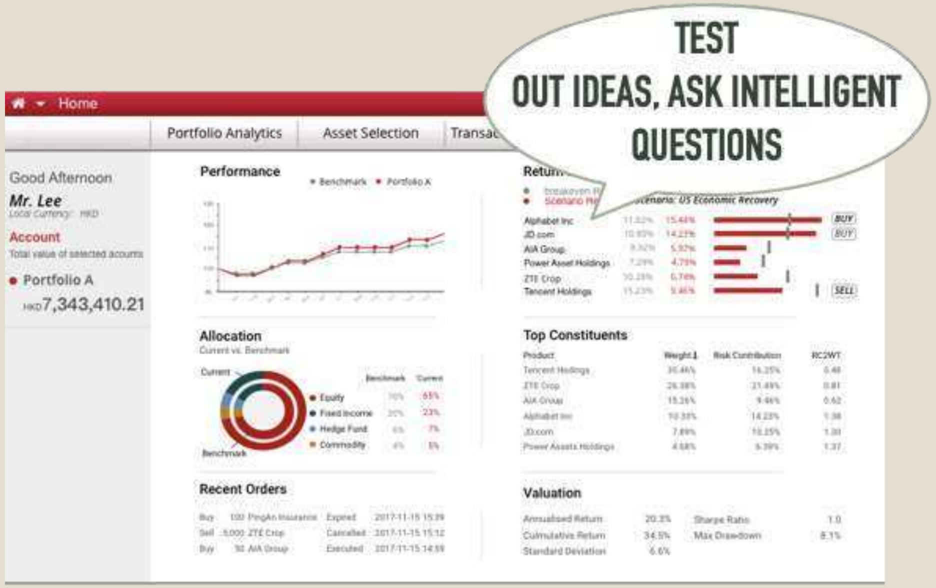
CUMULATIVE INDEX PERFORMANCE – RETURNS(KRW)(2017-03-31 - 2021-03-15)



INVESTOR INJECTING > USD 1B IN SEED FUNDS

Asset Class	Equities	Bond/Multi-Asset	Alternatives
Initial Slate (> 330M USD)	• US (30) • European+Swiss (30) • Japan (30) • Asia Pac + ANZ (30)	• US Investment Grade Corporate Bonds (30) • International Corporate Bonds (30)	• Fund of Funds (50) • Energy/Trade Tokenization (50) • Infrastructure (50)
Second Phase (> 170M USD)	• Growth (20) • Small/Mid Cap (20) • Tech (20)	• High Yield (20) • Convertibles (20) • ABS/MBS/CDO (20) • Regional (20)	• DeepTech (10) • BioTech (10) • GreenTech (10)
Positioning	• Enhanced Indices • Lower base fees, ability to customize • ESG conscious with ESG strict versions	• Elements used to create multi-asset mandates • Currency-managed	• Complements sustainability theme • Tokenization and blockchain for future distribution

SOLUTION 1: API ENGINE



INVESTOR

RELATIONSHIP MANAGER

Enhance investor portal w/ API Engine to preserve branding

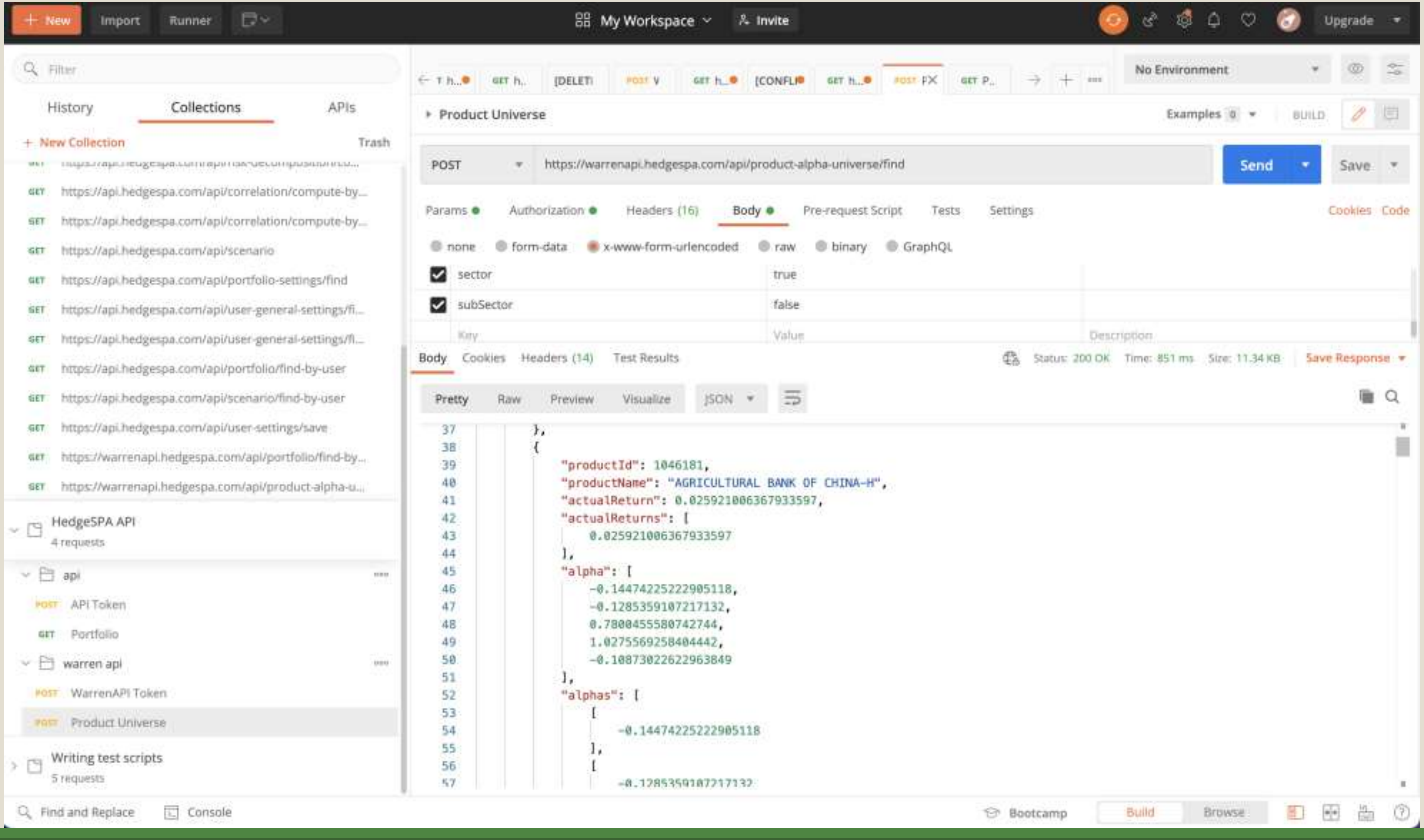
- **Analyze** investor portfolio based on bank research
- Generate **insights** from investor successes
- Layout research in objective manner for **investor actions**

→ Preserve bank **branding** with full API

→ Influence investors to **succeed** objectively

→ Encourage investor **actions** with unbiased bank research

API 2: SAMPLE API CALLED FROM POSTMAN



API 3: PYTHON EXAMPLE (C++, JAVA SUPPORTED) *NEW!*

portfolios.py - /Users/bernard/Documents/git/pnl_report/rebalancing_comp...

```python
import requests

#
# Get list of portfolios by user
#
# Input: base_url, token
# Output: array of portfolio objects
#

def get_portfolios(base_url, token):

    try:
        headers = {
            "Content-Type": "application/json; charset=utf8",
            "Authorization": "Bearer " + token
        }
        resp = requests.get(
            base_url + '/api/portfolio/find-by-user', headers=headers, timeout=100
        resp.raise_for_status()
        # Code here will only run if the request is successful
        result = resp.json()
        return result
    except requests.exceptions.HTTPError as errh:
        print(errh)
        return null
    except requests.exceptions.ConnectionError as errc:
```

Ln: 20 Col: 31

rebalancing_computation_3920.py - /Users/bernard/Documents/git/pnl_rep...

```python
password = "1gip#ss"
base_url = 'https://warrenapi.hedgespa.com'
f = open("/Users/bernard/Documents/git/pnl_report/output/report/Universe "+portfol

#
# Get Token
#
token = get_token(base_url, username, password)

def buy_sell(base_url,token,portfolio_product_id,r_output_df):

    alphas = get_alpha_universe(base_url, token, portfolio_product_id, True, True,
    f.write("                        \n")
    f.write("Product Alpha Universe\n")
    f.write("----------------------\n")
    print(portfolio_product_id, file = f)
    product_id_list = []
    product_name_list = []
    combined_rank_list = []
    for alpha in alphas:
        product_id = alpha.get('productId')
        product_name = alpha.get('productName')
        combined_rank = alpha.get('combinedRank')
        f.write("%7d %-32s %3d\n" % (product_id, product_name, combined_rank))

        product_id_list.append(product_id)
        product_name_list.append(product_name)
        combined_rank_list.append(combined_rank)

    temp_df = pd.DataFrame({'PRODUCT_ID':product_id_list,'PRODUCT_NAME': product_n

    current_products = list(r_output_df['PRODUCT_ID'])
```

Ln: 13 Col: 0

rebalancing_computation — -bash — 117×20

```
Best match: pandas 1.2.4
Processing pandas-1.2.4-py3.9-macosx-10.9-x86_64.egg
pandas 1.2.4 is already the active version in easy-install.pth

Using /Users/bernard/Documents/git/pnl_report/rebalancing_computation/env/lib/python3.9/site-packages/pandas-1.2.4-py
3.9-macosx-10.9-x86_64.egg
Processing dependencies for pandas
Finished processing dependencies for pandas
WARNING: The easy_install command is deprecated and will be removed in a future version.
Searching for openpyxl
Best match: openpyxl 3.0.7
Processing openpyxl-3.0.7-py3.9.egg
openpyxl 3.0.7 is already the active version in easy-install.pth

Using /Users/bernard/Documents/git/pnl_report/rebalancing_computation/env/lib/python3.9/site-packages/openpyxl-3.0.7-
py3.9.egg
Processing dependencies for openpyxl
Finished processing dependencies for openpyxl
200
Macintosh-5:rebalancing_computation bernard$
```

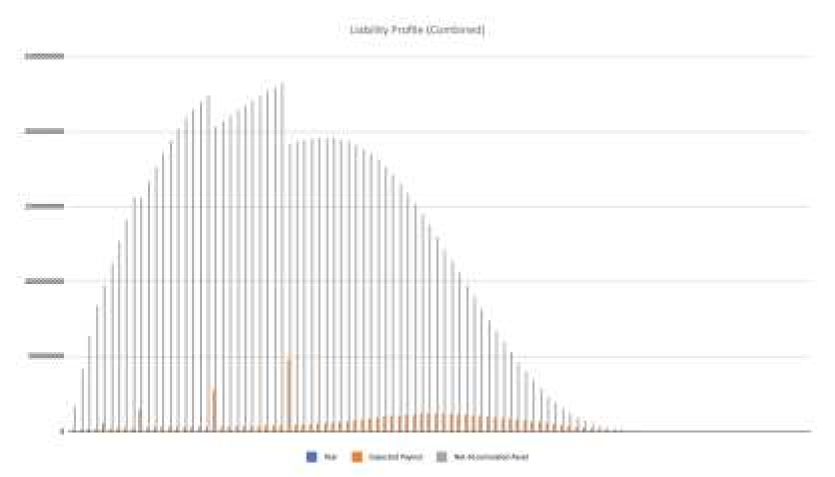
Universe 3920.txt

```
Product Alpha Universe
----------------------
1009161
1009161 PetroChina Co. Ltd.                1
1009164 China Petroleum & Chemical Corp    2
1009158 CNOOC Ltd                          3
1046240 CHINA SHENHUA ENERGY CO-H          4
1046507 CHINA COAL ENERGY CO               5
1046526 CHINA OILFIELD SERVICES-H          6
1046574 YANZHOU COAL MINING CO-H           7
1046631 Kunlun Energy Co Ltd               8
1046782 Hilong Holding Ltd                 9

Product Alpha Universe
----------------------
1046146
1046146 JD.COM ADR REPRESENTING INC CLASS   1
1046704 TAL EDUCATION GROUP ADR REPTG      2
1046223 BYD Co Ltd                         3
1046827 VIPSHOP HOLDINGS                   4
1046638 Guangzhou Automobile Group Co Ltd   5
1046655 GREAT WALL MOTOR LTD H             6
1046907 NEW ORIENTAL-ADR                   7
1046150 CTRIP.COM INTERNATIONAL ADR REPRE   8
1046686 ANTA SPORTS PRODUCTS LTD.          9
1046853 BAIC MOTOR-H                       9
1009172 Belle International Holdings Limited   9
1046317 Brilliance China Automotive Holdings Ltd    9
1046673 DONGFENG MOTOR GROUP LTD H         9
1046609 GEELY AUTOMOBILE HOLDINGS LTD      9
1046416 GOME Retail Holdings Ltd           9
1046852 MINTH GROUP LTD                    9
1046509 QUNAR CAYMAN ISLANDS LTD-ADR       9
1046637 SHENZHOU INTERNATIONAL GROUP LTD   9
1046795 Xingda International Holdings Ltd   9

Product Alpha Universe
----------------------
```

SOLUTION 2: ENTERPRISE APPLICATION FOR INSURERS



Ready-to-go app for Insurers to:

- Construct **Actuarial Profiles** by reading from policy pools such as salesforce

→ Get the latest exposure profile **right away**

- Recommend rebalancing based on **Basel 2** style calculations

→ **Straight-thru** calcs from policy pools to Basel 2

- Generate Before and After **Capital Adequacy** calculations

→ Free up **idle capital** from past practices of annual Cap Adeq calcs

INSURANCE SOLUTION DEMO

https://youtu.be/rOufL59uOCo

SOLUTION 3: TERMINAL SOLUTION *NEW!*

Ready-to-go app for Advisors to:

- Follow **Step-by-step guidance** to make portfolio recommendation

→ Save bank training time, **Faster** staff on-boarding

- Analyze suitability and recommend **New Products**

→ Demonstrate **clear value** added by bank

- Recommend actions on client portfolios to align with **Model Portfolios**

→ Ensure **compliance** & consistency with bank policies

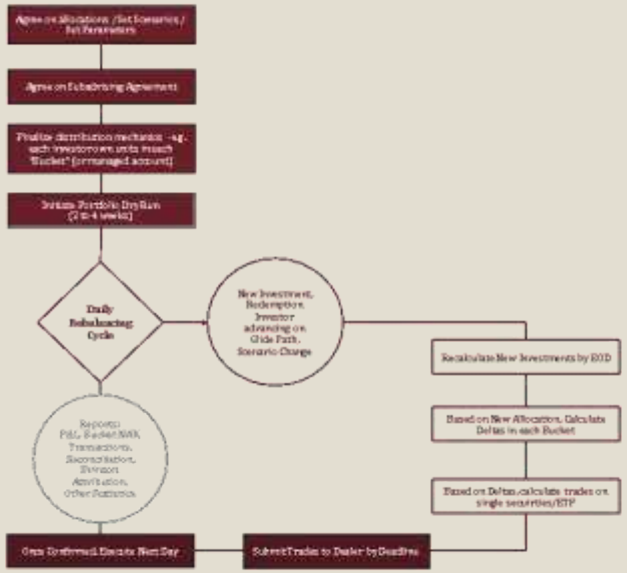
TERMINAL SOLUTION DEMO

https://youtu.be/XNivwbQ14GE

SOLUTION 4: SAMPLE INVESTMENT PRODUCTS *NEW!*

https://youtu.be/SBLgNjHfFfw

SOLUTION 5: ENHANCING INVESTMENT PROCESS W/ ESG *NEW!*



ESG elements are added to

- **Asset Selection** based on ESG factors
  → ESG as driver of **long-term** value
- Scanning of News/Social Media for ESG **Keywords**
  → Capture **recently-reported** issues
- **Subsector Definition** based on smart ESG qualifications
  → ESG ≠ Poor Performance

ESG VIDEO DEMO

https://youtu.be/bCLGhxsTyYE

SUCCESS!

NYC-based fintech industry publication Waters Technology

waterstechnology

DAILY

TOP STORY

TECHNOLOGY

Buy-Side Demand Builds for ESG Screening in Korea, Japan

HedgeSPA platform combines in-house and vendor ESG data for more comprehensive coverage of a larger target investment universe.

Thu 07 Mar | NEWS

NEXT STEPS?

Align Capabilities to Needs

- API engine to power investor portal to preserve branding?
- Capital Adequacy calculations for insurers or pensions?
- Advisor solution?
- Investment products?
- ESG solution for sustainability-conscious investors?

Define Simple Project Scope

- We offer a way to test without messy integration!
- How to get useful feedback?
- Success criteria?

Let's Get to Work

- Next steps upon successful testing?
- Build business unit buy-in?
- Compliance, other units?

Awards and Accolades

1. Only In-bound Fintech Company to be featured by X-Hub Program of Tokyo Metropolitan Government in Accomplishment Report (2021)
2. Mentioned by Nikkei Newspaper (2021)
3. Finopitch Japan Award (2021)
4. Finalist in Tokenized Assets and Digitalized Securities Award (2020)
5. Finalist in ITC-DIA World Tour - Insurtech Connect (2020)
6. F10 (Swiss) Accelerator (2020)
7. Won EFMA-Accenture Innovation in Insurance Award (2019)
8. Ping An Accelerator (2018)
9. Benzinga Fintech Awards Finalist for “Leveling the Playing Field” category (2018)
10. Hong Kong Institute of Bankers Fintech Awards (2018)
11. Diligence Vault named us as key player in global InvestTech Ecosystem (2018)
12. Singapore Airshow AI Excellence award in Emerging Tech category (2018)
13. ETNET recognized us with Fintech award - Outstanding Cloud-based Analytics Platform (2018)
14. Monetary Authority of Singapore recognized us with MAS Fintech Award (2017)
15. Waters Technology described our analytics as powering the next generation of investment (2017)
16. Boston Consulting Group described our platform as a full front-to-back suite of services (2017)
17. Frost and Sullivan called us disruptive fintech participant (2016)
18. Venture Scanner named us a global fintech leader (2016)
19. Accenture Fintech Innovation Lab APAC Finalist (2016)
20. Red Herring Asia and Global Top 100 Awards (2015)
21. DBS Fintech Challenge Prize-Winner (2015)
22. Benzinga Fintech Awards Finalist (2015)
23. Forbes called us industry disrupter (2014)

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Questions:
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