



Adam M^cCudden

Pharmaceutical Development

A Career in Pharmaceutical Development

- **Current Employer: AstraZeneca**
- **Career Path**
- **Current Role: Senior Scientist Pharm. Dev.**
- **Highlights**
- **Voluntary Work**
- **Hobbies**
- **Choices I Made Along The Way**



AstraZeneca, the UK's 2nd Largest Pharmaceutical Company

~\$25 Billion In Sales last Year. Market Value \$73 Billion.

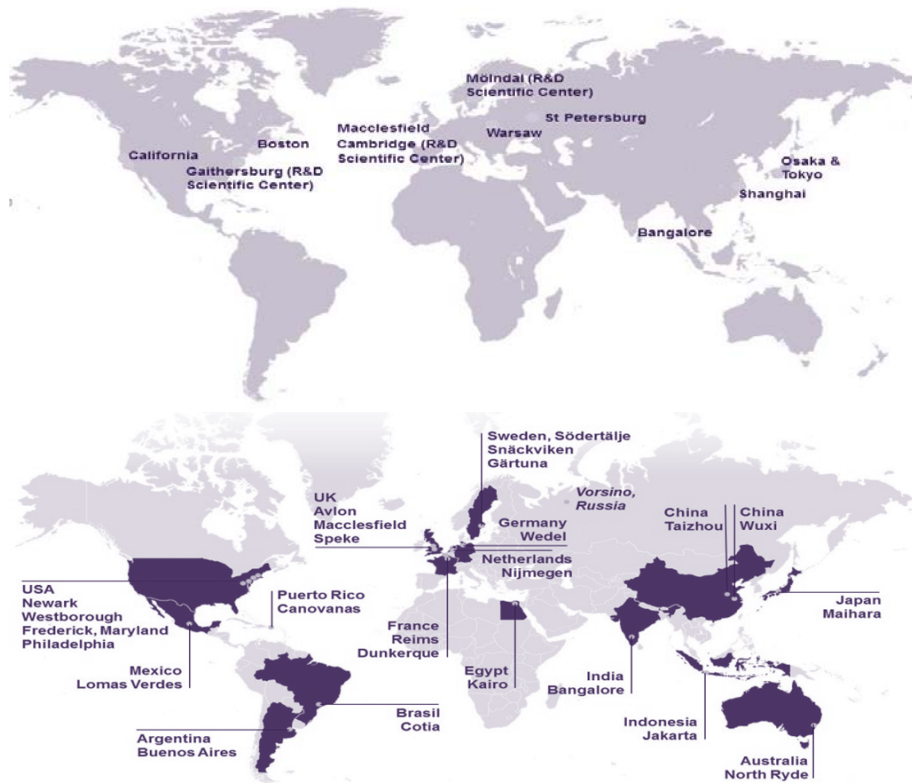
9th largest company on the FTSE. (7th or 13th largest Pharmaceutical company globally).

Company	Ticker	Sector	Market cap (£bn)	Employees
Royal Dutch Shell	RDSA	Oil and gas	160.12	90,000
Unilever	ULVR	Consumer goods	90.42	171,000
HSBC	HSBA	Banking	88.11	267,000
British American Tobacco	BATS	Tobacco	71.4	87,813
GlaxoSmithKline	GSK	Pharmaceuticals	67.38	97,389
SABMiller	SAB	Beverages	67.32	70,000
BP	BP	Oil and gas	63.13	97,700
Vodafone Group	VOD	Telecomms	56.55	86,373
AstraZeneca	AZN	Pharmaceuticals	51.23	57,200
Reckitt Benckiser	RB	Consumer goods	46.32	32,000
Royal Bank of Scotland Group	RBS	Banking	28.6	150,000
Barclays	BARC	Banking	27.18	150,000
Tesco	TSCO	Supermarket	14.92	519,671



GlaxoSmithKline





MACCLESFIELD WORKS



ALDERLEY PARK

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Education

Stocksbridge High School: 10 GCSEs.

King Edward VII Six Form: 5 A-Levels, 1 S-Level, 1 NVQ.

Manchester University: MChem Chemistry.

**Vocational: IOSHH Managing Safely.
Plus a range of courses.**



Odd Jobs:

Worked my way through university with a selection of summer, evening and weekend jobs:



Debenhams



Boots



Coffee Shop



Cocktail Bars / Pubs



Call Centre



Wheelchair Refurbishers



Gender, Relationship and Sexual Dysfunction Clinic.



Career Path:

I've worked for a variety of chemical companies:

DyStar 

 **BASF**



Dye Company

 **APOLLO SCIENTIFIC**

Fine Chemical Supplies

Lilly

ELANCO TM

Pharmaceuticals
(Human & Animal)

AstraZeneca 

Pharmaceuticals

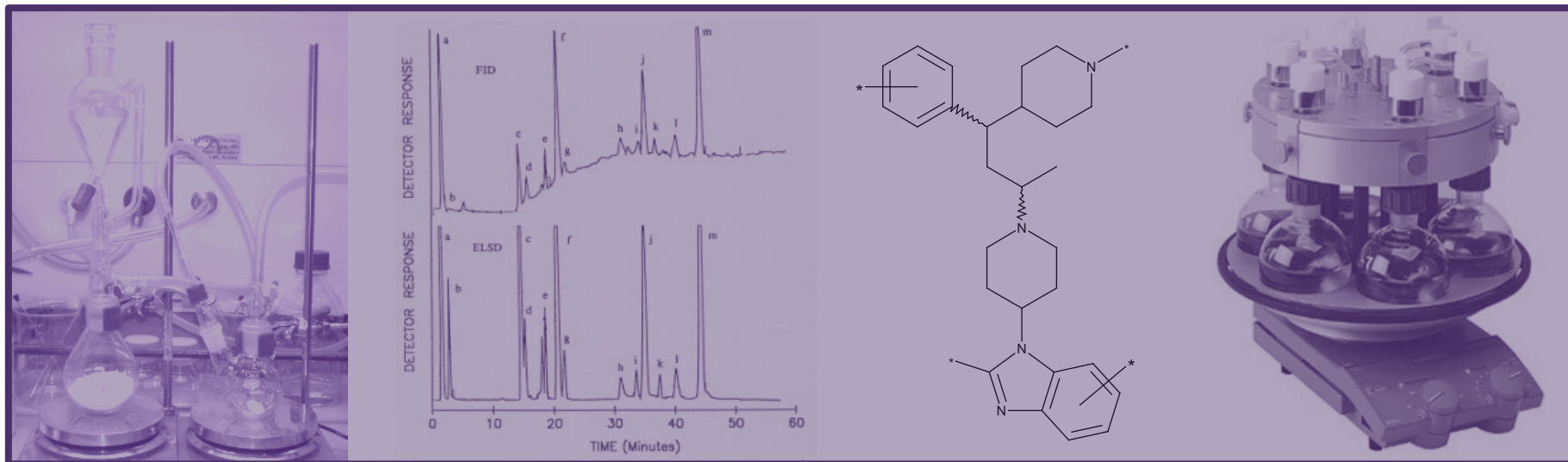
Industrial Sandwich Placement:

Discovery Medicinal Chemist (Arthritis)



Lots Of Chemical Reactions:- Suzuki Couplings, Finkelstein Reactions, Amide Couplings, Hydrogenation, Organometallic reactions.

Techniques Used:- NMR (various), HPLC (prep), LC-MS, MPS, Microwave Reactions, Solid Phase, Flash LC, TLC.



Dystar MChem Research Project:

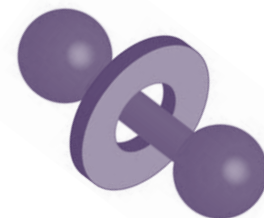
Reactive Dye - β -CD Rotaxane Synthesis



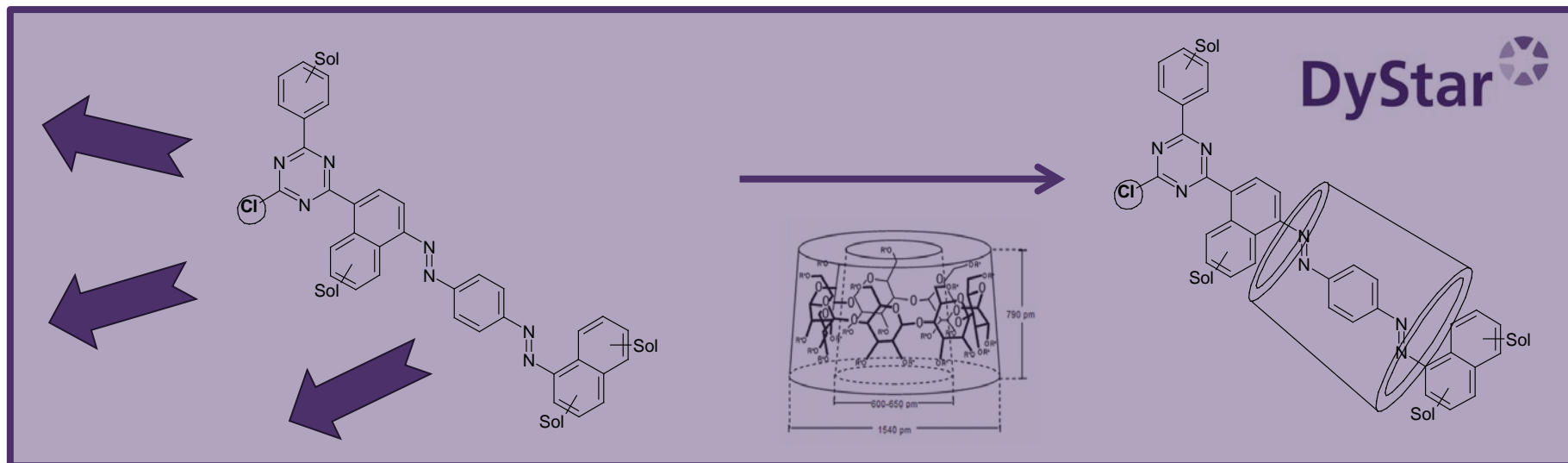
➤ Dye Synthesis

➤ Rotaxane Formation

➤ Characterisation



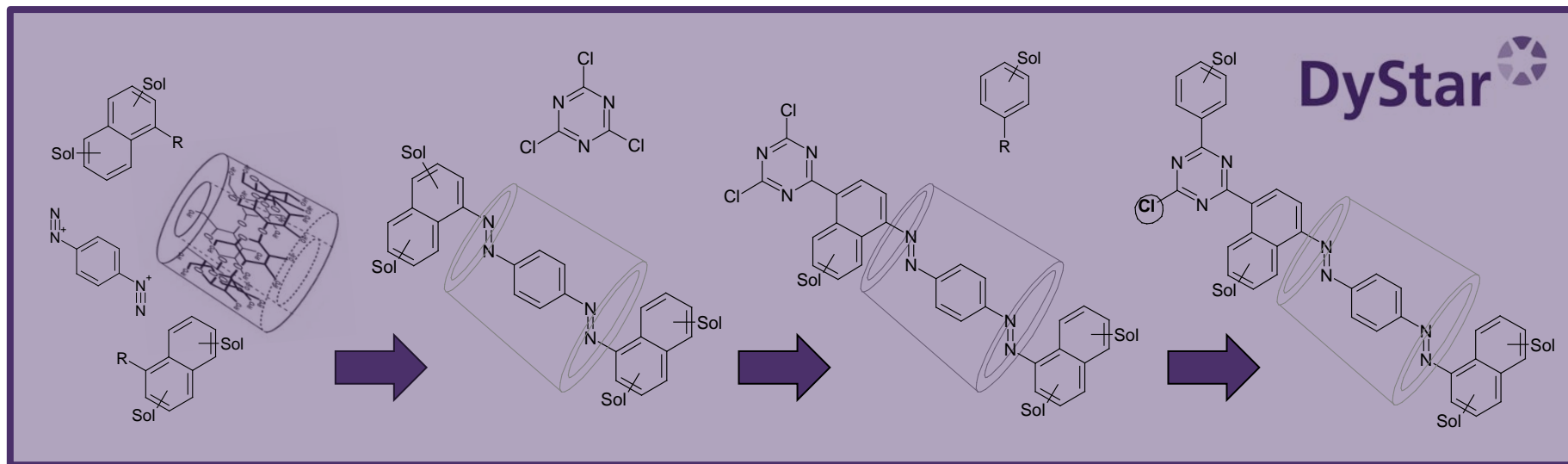
Techniques Used:- NMR (NoE), HPLC, UV, IR And LCMS

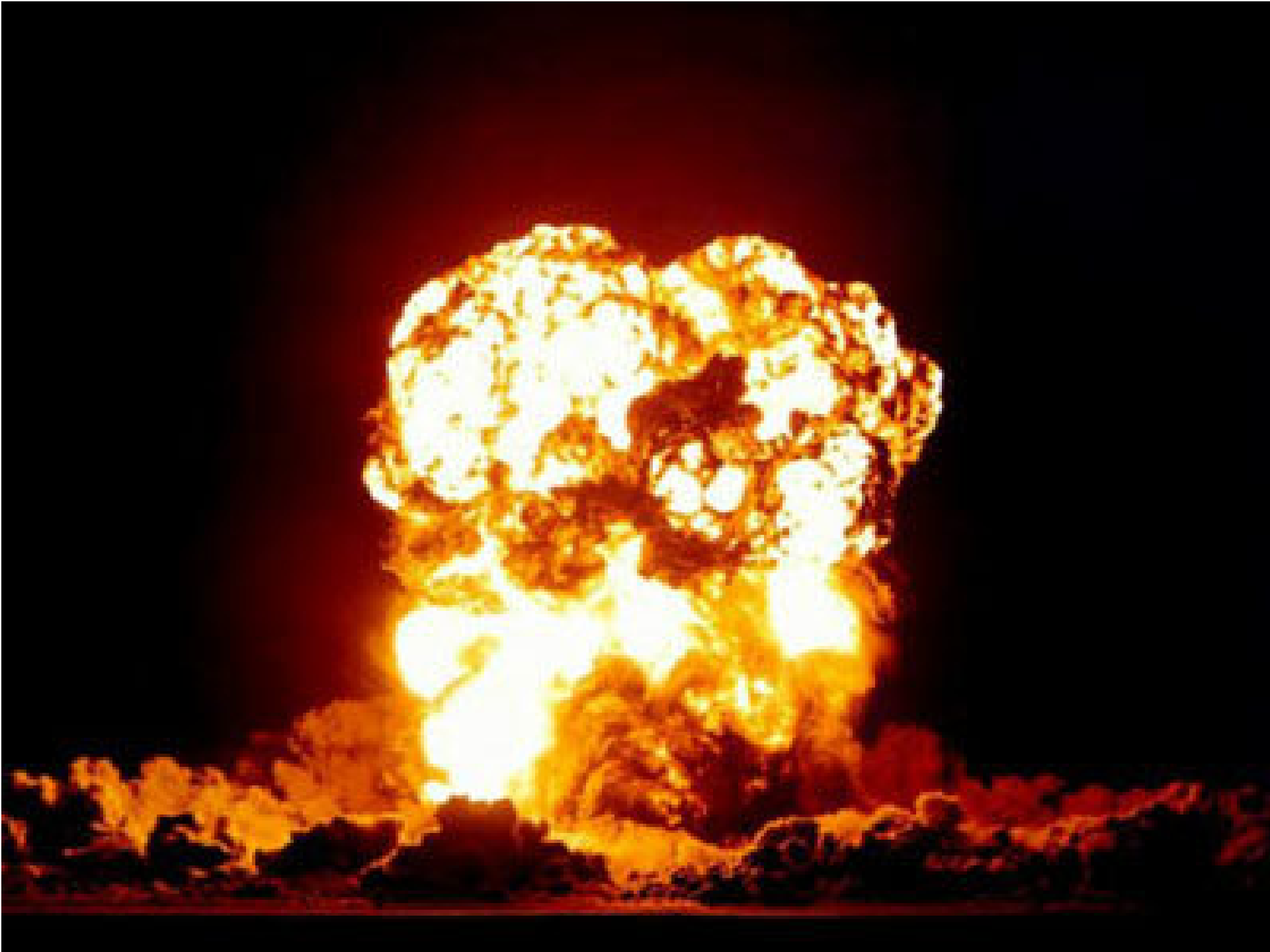


Dystar MChem Research Project:



As these were Azo Dyes, a lot of my time was spent trying not to do this:



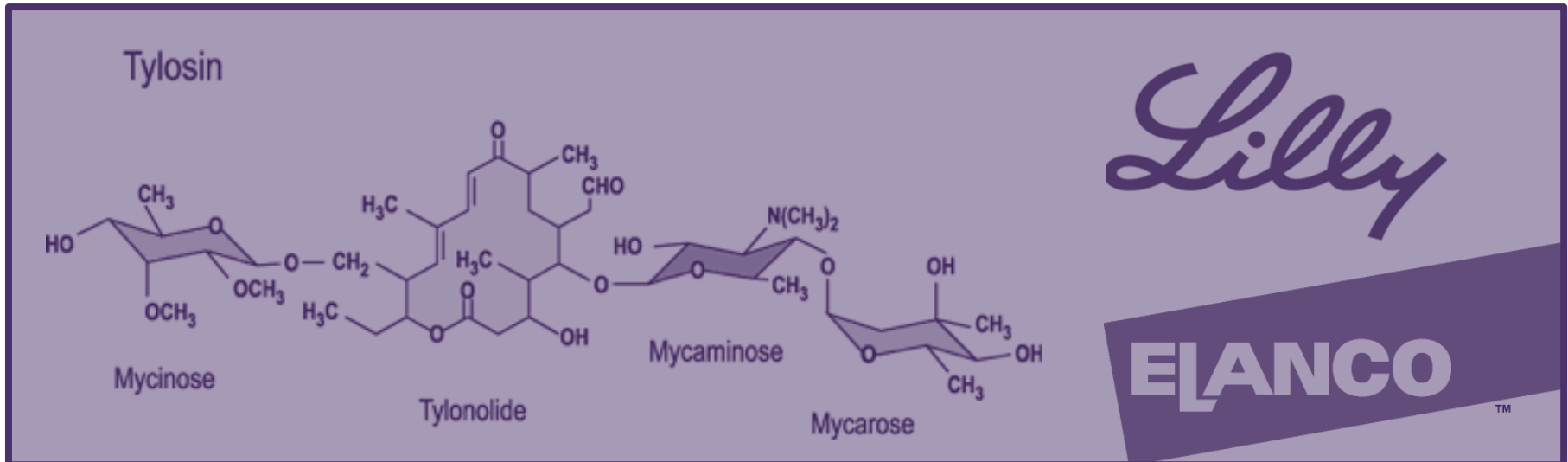


Compliance Analyst

Quality Control/Assurance) Working to GMP.

Testing Fermented Antibiotic Products.

Wet Chemistry/Pharmacopoeia Testing:- Loss On Drying, Particle Size Distribution, GC, Sulphated Ash, Fire & Brimstone, Total Solids etc...



Techniques Used at AstraZeneca



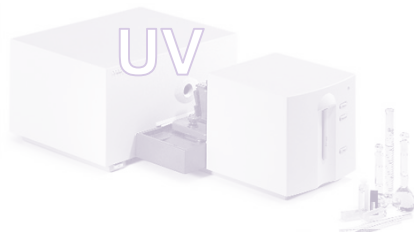
pH



Karl Fischer



IR



UV



NMR



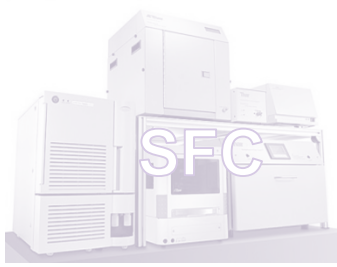
GC



HPLC



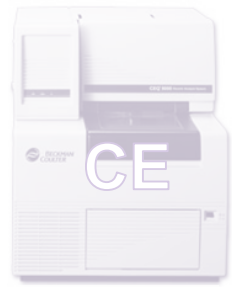
IC



SFC



UHPLC



CE



GC-MS



CAD



ELS



ICP-OES



MS



RoI



TGA



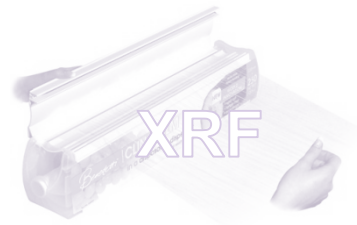
DSC



DVS



XRPD



XRF



Disso.



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Pharmaceutical Development:



Pharmaceutical Development:

Using Good Science To Answer Important Questions:

- How Can We Turn A Chemical Into A Medicine?
- How Can We Guarantee Its Quality?
- How Stable Will It Be?
- Can We Get It To Where The Body Needs It?
- Will It Work When It Gets There?
- Is It Soluble In Tango?

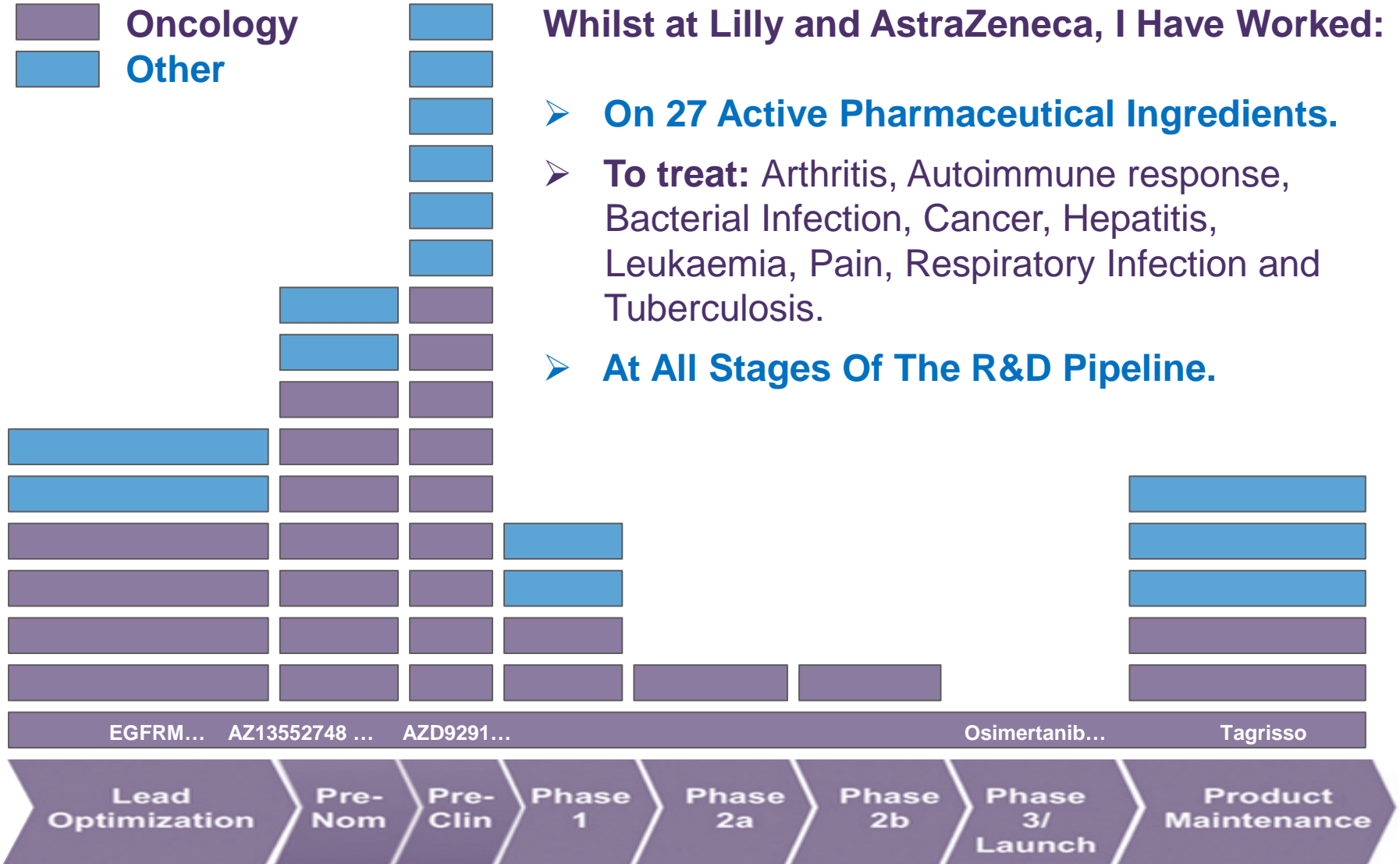


My Pharmaceutical Development:



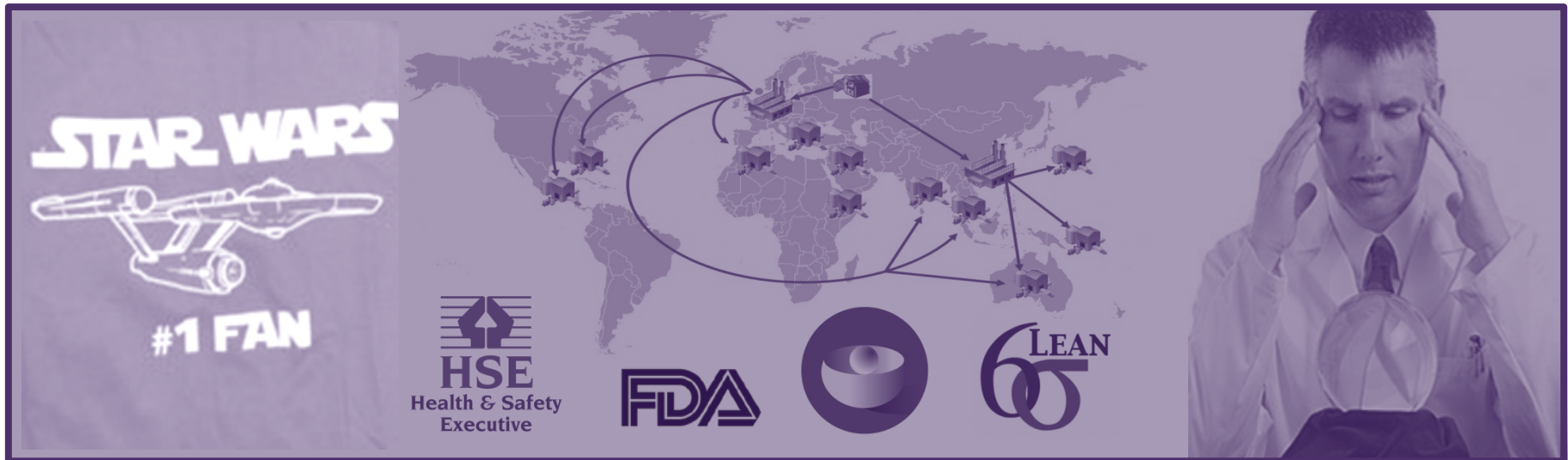
Whilst at Lilly and AstraZeneca, I Have Worked:

- **On 27 Active Pharmaceutical Ingredients.**
- **To treat:** Arthritis, Autoimmune response, Bacterial Infection, Cancer, Hepatitis, Leukaemia, Pain, Respiratory Infection and Tuberculosis.
- **At All Stages Of The R&D Pipeline.**

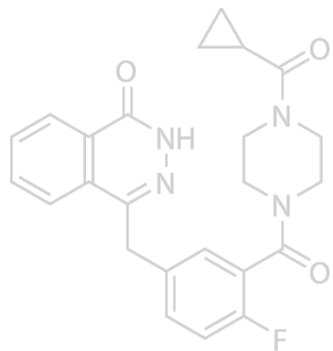


Experience:

- Analytical >>> Solid state, Biopharm, Formulation.
- Safety Health and Environment.
- Predictive and Accelerated Stability.
- Regulatory Submissions.
- Anti-Counterfeiting.
- Outsourcing, Tech-Transfer and Supply Chain.
- Lean 6 Sigma, PCA and MVA Investigations.



Projects: The Two That Made It



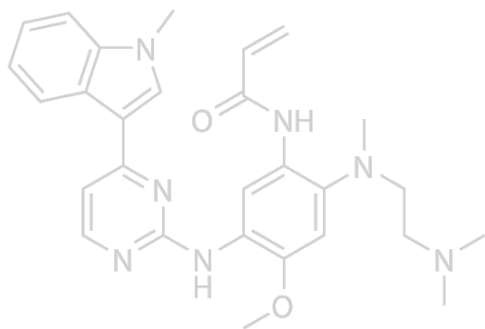
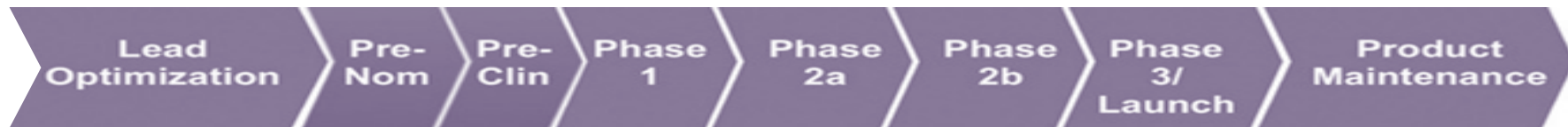
AZD2281



Olaparib



Lynparza™



AZD9291

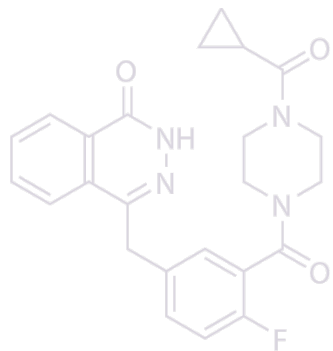


Osimertanib



Tagrisso™

Tagrisso:



AZD2281



Olaparib



Lynparza™

2005

2006

2014 / 2016

Lead Optimization

Pre-Nom

Pre-Clin

Phase 1

Phase 2a

Phase 2b

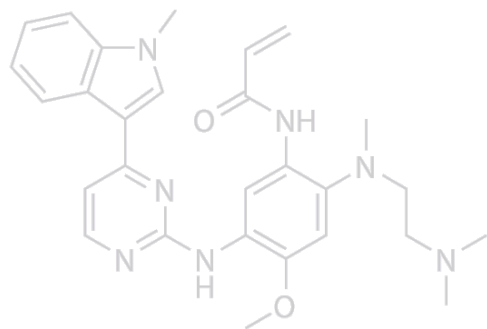
Phase 3/
Launch

Product Maintenance

2011

2013

2015 / 2016 / 2016



AZD9291

Fastest in History
Why So Fast?
Because It Works...

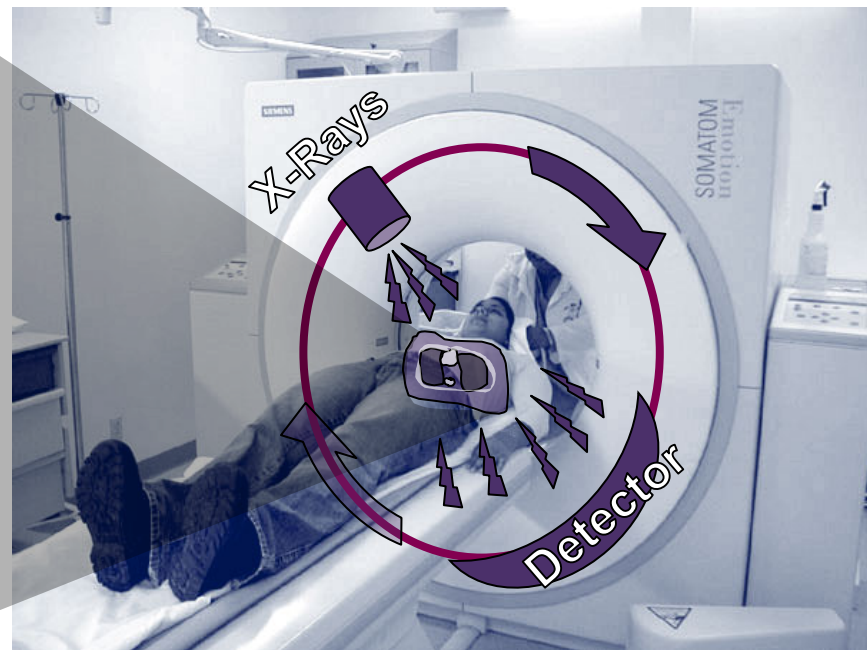
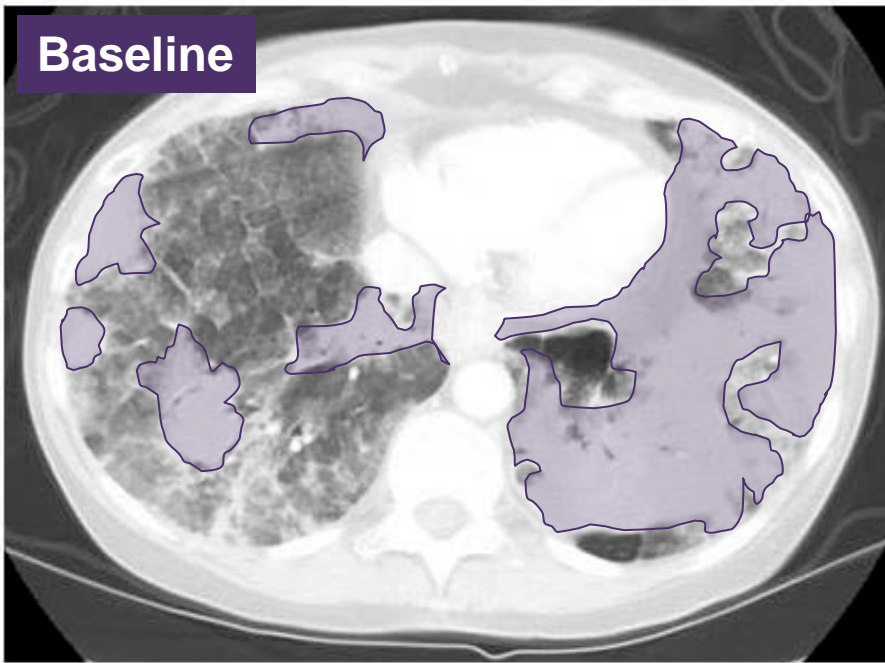


Osimertanib



Tagrisso™

Baseline



Baseline



Computerised Tomography scans (aka CAT scans) display a slice taken through the body.

Achieved by taking a number of X-rays from different angles to build a computer image

Healthy lungs show up as dark regions.

Light areas represent the spine, heart, ribs and...

Tumours.

HIGHLIGHTS:

- I See The Patient Benefit From The Work that I Perform
- Everyday Is Different.
- Always Learning New Things.
- I Get Paid To Do Something I Enjoy.
- Lots Of Problem Solving.



Ishakawa

A photograph of a corkboard covered in numerous colorful sticky notes. A purple fishbone (Ishikawa) diagram is drawn over the board, with a central horizontal spine and two diagonal ribs on each side, pointing towards a rectangular box on the right side of the board.

Lean 6σ

1	2	3	4
W.S.H.S.C.S.W.O.H.O.C.O.	W.S.H.S.C.S.W.O.H.O.C.O.	W.S.H.S.C.S.W.O.H.O.C.O.	W.S.H.S.C.S.W.O.H.O.C.O.
Difference due to Sonication?			
✓	✗	✓	✗
Difference due slower disintegration?			
✗	✓	✓	?
Crushing converts		back to API?	
✗	✗	✗	✓
NEXT STEPS / INVESTIGATIONAL FOCUS			
A Focus on pre-sonication shaking and standing times or alternative agitation	B Focus on reducing Disintegration time: eg Manual shake, aqueous dispersal	A and B	Reassess Options
SAMPLE LABELLING: W.S. - Whole tablets, sonicated. W.O. - Whole tablets, orbital mixing. H.S. - Halved tablets, sonicated. H.O. - Halved tablets, orbital mixing. C.S. - Crushed Tablets, sonicated C.O. - Crushed Tablets, orbital mixing.			
Disintegration time: 5 Smins Disintegration time: 10-15mins Disintegration time: Quicker than whole Disintegration time: Quicker than whole Disintegration time: 0mins Disintegration time: 0mins			

Voluntary Work:

Volunteer For A Number of Charities:

Organising, Promoting or Funding A Range Of Activities:

Whisky/Wine/Beer/Gin/Chocolate Tastings, Science Demonstrations, Administration, Event Planning, Careers Talks, Outreach Events, Industry Visits, School and Public Interest Lectures, Travel Bursaries, teacher training...



Hobbies

Science Engagement – Blogs RSC etc.

Whisky – Whisky Club, Tastings & Blog.

Food and Drink – Cooking & Eating Out.

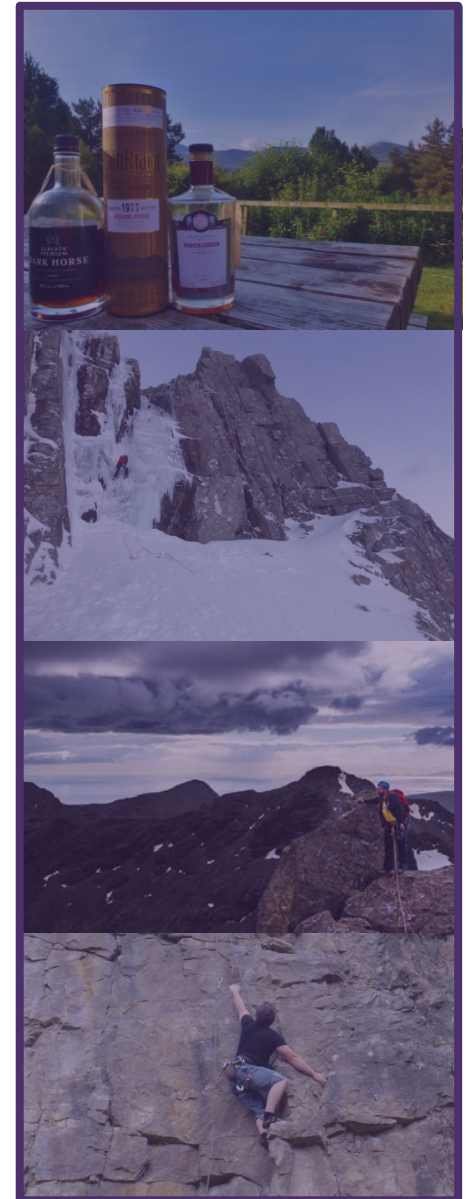
Rock Climbing – Indoors & Across the EU.

Music – Gigs & Playing Bass Guitar.

Mountaineering, Via Ferrata & Walking.

Photography – Food, Climbing & Scenery.

Ice Climbing – Avoiding Snappy Ice-Death.



In Summary: Crucial Choices I Made

MChem

Industrial Placement

Odd Jobs, Hobbies & Voluntary Work

Questions?

- What are you good at?
- **What do you enjoy?**
- What motivates you?