Royal Academy of Engineering

Innovation and Education
Educating Tomorrows Engineers for Success in the Digital Age

Experiences of a VP
Kevin Steptoe – Chief Technical Office Sondrel Ltd.

27th November 2019
High Quality IC Design
Sondrel is a unique and trusted provider of high quality IC design and supply across multiple end markets. We offer our clients a turnkey service from system design to the supply of production silicon: one reliable partner for the whole journey.

Design Capability
Since 2002 Sondrel has provided outsourced IC consultancy to some of the world’s leading technology brands, gaining access to the most advanced processes and technologies and the design challenges they present. Our experience of the newest IP, processes and technologies allows us to draw from the broadest possible range of options in our concept to silicon design work. As an independent design company the objectivity we bring to IP selection works to your advantage.

Domain Experience
- Video Processing
- IoT
- Video Analytics
- Automotive
- Machine Learning
- Artificial Intelligence
- AR/VR
- Blockchain
- Networking

Key Facts
- 200+ highly qualified IC engineers
- 100s of designs to 7nm
- UK headquartered
- 9 offices worldwide
- Founded 2002

Locations
- HQ: Theale, Reading, UK
- UK: Bristol, Kings Langley
- USA: San Jose
- China: Shanghai, Xi’an
- France: Sophia Antipolis
- Morocco: Rabat
- India: Hyderabad

Accreditations
- Arm Approved Design Partner
- SAMSUNG FOUNDRY SAFE™ Design Service Partner
- tsmc TSMC Design Centre Alliance Partner
- Global Semiconductor Alliance Member
- Royal Academy of Engineering - Educating for the Digital Age Experience of a VP

ISO 27001 compliant secure design centres
Introduction

• VP Initiation
  • Getting to feel at home in the department – being part of a team
    • An office!
    • Welcome and introductions – tour
    • Head of Department meeting
    • Put on distribution lists and included in communications
      • Admin staff often the hub of information use them.
      • Advisory Board – extremely valuable way to feel a team and bond around a goal.
  
• Initial meeting scope and expectation setting
  • Want – and what I can give
    • exploration – brain storm – think outside of box

• Planning the year(s)
  • Begin with the end in mind start with learning outcomes. I would like that…..
  • Be ambitious
  • Iterate and learn from each year.
Design of Application Specific Integrated Circuits or ... ASIC Basics!

- Real examples and case studies – a day in the life of a Sondrel engineer...
- Series of three lectures
  - ASIC From theory to reality
  - What you as an engineer would do to make interesting products.
- Master class on low power design, with direct relevance to modern mobile devices
- Smaller workshop
  - Break out informal group Q&A
  - Career advice.
Engineering Design Projects Y1 – Working in teams

• Project work throughout the entire course is central to teaching method and engineering experience in the course. Starts in Year 1.
  • Students design, build and market a product to a fictitious client. Blogs and videos are required to market the product. Demonstrations are given.

• My role:
  • Project Management
    • Theory and practice: Real life examples. (Horror)
    • Top reasons with examples on why projects succeed (and fail)
    • Practical tips for what project teams are about to embark on.
  • Sales and marketing how to take a project to market.
    • Hi tech start ups.
    • Customer experience introduction with examples.
  • Giving Presentations
    • Practical advice and experience on how to prepare and deliver a presentation

• eLearning log
  • Tool for helping and supporting students learning journey. E.g. linkage between project management theory and students ability to plan work needs help.
Management and Marketing for Technology:

Two Transferable skill sessions:

1. Customer Experience – the VP’s passion!
   - A transformative *interactive session* in which:
     - The components of customer experience are deconstructed to derive, how experiences are created: material and emotional: both of which must be engineered for success.

2. Marketing of technology
   - Largely based on the classic text: ‘Crossing the Chasm’ *– how to bring high technology to market.
   - Also based on my personal experience of three USA start ups that I have been involved with.

*Geoffrey Moore*
Management and Marketing for Technology
Big Data and Machine Learning

From Theory

To a (risky) live demo

Artificial Neural Network – Hidden Layers

\[ y = f \left( \sum_{i=1}^{n} x_i W_i + b \right) \]

<table>
<thead>
<tr>
<th>Hidden Layers</th>
<th>X_1</th>
<th>X_2</th>
<th>OR</th>
<th>NAND</th>
<th>AND</th>
<th>Y</th>
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In [20]: from sklearn.neighbors import KNeighborsClassifier
2 knn = KNeighborsClassifier(n_neighbors=4)
3
In [21]: knn.fit(x_train, y_train)
4
Out[21]: KNeighborsClassifier(algorithm='auto', leaf_size=30, metric='minkowski', metric_params=None, n_jobs=None, n_neighbors=4, p=2, weights='uniform')

In [22]: x_new = np.array([[0, 3, 9], [1, 2, 1]])
2 print("x_new.shape", x_new.shape)
3 x_new.shape: (2, 3)

In [23]: prediction = knn.predict(x_new)
2 print("Prediction: ", prediction)
3 print("Predicted target name: ", iris_dataset['target_names'][prediction])
4 Prediction: [0]
Predicted target name: ['setosa']

In [24]: X_train, X_test, y_train, y_test = train_test_split(1
2 iris_dataset['data'], iris_dataset['target'], random_state=0)
3 knn = KNeighborsClassifier(n_neighbors=4)
4 knn.fit(X_train, y_train)
5
6 print("Test set score: ", format(iris.score(X_test, y_test)))
7 Test set score: 0.97
Participation in Advisory Board

• Is a body which helps to direct strategic direction of the department utilising the industrial experience of the board
  • Work is very practical and has true outcomes for the department
  • Homework is given beforehand and is a full day
  • Has included:
    • Future elements and teaching direction of the new initiative of General Engineering UG programmes:
    • Developing General and transferable skills desired by potential employers

• Half day of with all final year project students allowing the students to summarise their projects to a ‘stranger’.

Very successful for both parties

Recommended
Feedback and analysis

“He had lots of experience and drew on his experiences to enhance the lecture”

“He enthusiasm and interesting stories / real examples kept the lecture interesting”

<table>
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<th>Topic</th>
<th>Definitely Agree</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Strongly Disagree</th>
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<tr>
<td>Overall</td>
<td>61%</td>
<td>30%</td>
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<td>Contributed to Understanding</td>
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<td>33%</td>
<td>12%</td>
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<td>Speaks and Writes Clearly</td>
<td>52%</td>
<td>21%</td>
<td>3%</td>
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<tr>
<td>Is Good at explaining things</td>
<td>48%</td>
<td>33%</td>
<td>9%</td>
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<td>Makes the subject Interesting</td>
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<tr>
<td>Enthusiastic about subject</td>
<td>45%</td>
<td>30%</td>
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<td>Uses teaching aids and applications well</td>
<td>36%</td>
<td>36%</td>
<td>15%</td>
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Summary

• Initiation and orientation is important
• Begin with the end in mind when planning i.e. what is the learning outcome
• The preparation of material can be longer than you think.
• You always generate more material than is needed!
• Be prepared to learn, adapt and pivot.
• Be inventive about delivery methods (keep it up to date)
  • E.g you might not see a pen in the lecture theatre!

• Highly rewarding - I loved it and I learnt a lot!

• University of York Staff and Students were absolutely fantastic.
  • Special thanks to my academic champion, Professor Andy Tyrrell for his endless support