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OpGen (Nasdaq/OPGN)

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BUY AMR Gene Panel is near-term focus

OpGen is a precision medicine company using molecular diagnostics and bioinformatics to help combat infectious disease

Investment Highlights

1) OpGen reported financial results for their Q2/2018 quarter, including an increase in revenues of 12% year-over-year to \$790,000 from \$700,000, led by growth in collaboration revenue from a contract with the US CDC. Net loss for the quarter decreased to \$3.3 million or (\$0.57) per share, from \$4.2 million or (\$3.73) per share in the prior year period, primarily due to reduced operating expenses but also from improved product margins. R&D progress during the quarter centered around OpGen's Acuitas AMR Gene Panel u5.47, including positive dialogue with the US FDA regarding regulatory pathway and recent presentation of clinical data for the panel at the ASM Microbe conference. Operating cash burn was approximately \$3 million in the third quarter, and at the end of the period OpGen held \$7.4 million in cash on hand. The Company was also able to successfully modify the terms of its long-term debt held by Merck's Global Innovation Fund (MRK, Not Rated) including extending the note's maturity.

2) While Company management did not provide specific financial guidance for the remainder of 2018, they did express optimism regarding commercial momentum for new gene panel products. Thus, we are estimating that product sales will improve slightly for the second half of this year, allowing OpGen to post 12% growth in overall revenues this year to \$3.6 million. Assuming improved gross margins and reduced overhead expense levels for the rest of the year, we are also estimating that OpGen will record a net loss of \$12.0 million or (\$2.00) per share in 2018E, an improvement over 2017's net loss of \$15.4 million or (\$9.81) per share. Current cash on hand for the Company is estimated to last into calendar 2019.

3) OpGen's focus for the next year or two is clearly on advancing its Acuitas AMR gene panel test program, which also employs the Company's Acuitas Lighthouse software for analysis. Timing is short-term; OpGen's goal is to complete its first clinical trial for bacterial isolates and file a 510 (k) application with the FDA by the

Current Price \$1.80
Price Target \$3.20

| Estimates | F2016A | F2017A | F2018E |
|------------------|---------|---------|-----------|
| Revenues(\$000s) | \$4,026 | \$3,211 | \$3,600 E |
| 1Q March | 1,077 | 772 | 846 A |
| 2Q June | 1,183 | 703 | 789 A |
| 3Q September | 760 | 745 | |
| 4Q December | 1,007 | 991 | |

| EPS (diluted) | (\$27.59) | (\$9.81) | (\$2.00) E |
|---------------|-----------|----------|------------|
| 1Q March | (8.98) | (4.78) | (0.75) A |
| 2Q June | (9.27) | (3.73) | (0.57) A |
| 3Q September | (5.79) | (1.74) | |
| 4Q December | (5.27) | (1.33) | |

| | | | |
|--------------|-----------|----------|----------|
| EBITDA/Share | (\$25.21) | (\$8.72) | (\$1.68) |
| EVEBITDA (x) | N/A | N/A | N/A |

| Stock Data | |
|----------------------------------|----------------|
| 52-Week Range | \$1.62-\$10.25 |
| Shares Outstanding (mil.) | 6.0 |
| Market Capitalization (mil.) | \$10.8 |
| Enterprise Value (mil.) | \$3.8 |
| Debt to Capital (6/18) | 16.9% |
| Book Value/Share (6/18) | \$1.07 |
| Price/Book | 1.7 x |
| Average Trading Volume (3-month) | 230,000 |
| Insider Ownership | 4.0% |
| Institutional Ownership | 33.2% |
| Short interest | 600,000 |
| Dividend / Yield | \$0.00/0.0% |



Price target and ratings changes over the past 3 yrs:
 Initiated - June 19, 2017 - Buy - Price Target \$2.00
 Updated - August 6, 2018 - Buy - Price Target \$3.20 (Reverse Stock Split)

end of this year, with subsequent 510(k) submissions targeted for early 2019. OpGen introduced a Research Use Only (RUO) version of the Acuitas AMR Gene Panel u5.47 earlier in 2018, and the Company hopes this year to sign up a number of large hospitals, pharmaceutical companies and clinical research organizations under this program and record associated revenues from sale of the test panel reagents. Further down the road, the Company also plans to enter into additional agreements for both supply and cooperative development in support of the broader Acuitas product family, add revenue-generating system placements for its QuantStudio 5 and EZ1 Advanced XL products, as well as continue to seek third-party funding for additional development programs.

Conclusion

OpGen continues to make progress in transitioning its diagnostic product line to its new Acuitas Rapid Tests and Acuitas Lighthouse Knowledgebase offerings, which are targeting the large, expanding multi-drug resistant organism market. While this transitioning is happening, however, OPGN shares continue to suffer, and the stock is currently trading at significant valuation discounts to its six-stock peer diagnostic products group. With several new partnerships signed recently, and more to possibly come in the future to go along with new regulatory approvals and product launches, we believe OPGN shares are poised for a bounce-back as positive news flow continues into the future, and thus we are maintaining our BUY rating on OPGN shares and instituting a new 12-18 month price target of \$3.20 per share reflecting a recent reverse stock split. (For complete stock valuation methodology, please see our Initiation Report dated 6/19/2017)

Risk Factors

In addition to normal economic and market risk factors that impact most equities and the common risks shared by OpGen with other companies in the industry, we believe an investment in OPGN involves the following risks:

- **Reliance on key management** – At present, OPGN relies on several key members of its management team who either founded the Company or have been in key executive positions for an extended period of time. Should one or more of these key executives leave the Company, OPGN could find it difficult to replace their long-standing knowledge of operations and industry expertise.
- **Reliance on partnerships** – To date, OPGN has signed a number of marketing and development partnerships and joint ventures for its diagnostic tests and information services. Thus, in the future certain factors related to product marketing and/or new product development may be determined by third parties and out of the control of Company management.
- **Limited stock liquidity** – Trading volume in OPGN stock is comparatively light and these shares have a relatively limited history of trading compared with other healthcare stocks. As such, news regarding OPGN, its target market, partners and/or competitors could lead to significant volatility in the stock price.
- **Competitive Markets** – The Company and its partners compete in its target diagnostic markets with a number of companies, many of which are considerably larger than the Company. There can be no assurance that the Company and its partners will be able to successfully compete and launch new products into these competitive markets in the future.
- **FDA and regulatory risks** – OPGN and its partners are subject to regulatory review for ongoing diagnostic tests and information products, principally the US Food and Drug Administration’s approval and laboratory review processes. In addition, the quality assurance and manufacture of the Company’s diagnostic products are subject to ongoing oversight and regulation, and any negative correspondence from the FDA or other regulatory agencies could have an adverse effect on the ongoing operations of the Company.

- **Lack of historic profitability** - OPGN has not achieved operating profitability since its founding, and according to our forecasts may not be expected to do so in the near future. Although the Company maintains adequate cash reserves at the present time, there can be no assurance the Company will not need to raise additional working capital in the future should operating losses continue.
- **Need to defend patents and other intellectual property** – OPGN currently holds approximately 170 US and International patents on its products and information services, some of which expire in the near future. The Company may be required to defend its patents in the US and overseas in the future, and there can be no assurance these defenses will be successful.

Robert M. Wasserman

OpGen, Inc.
Consolidated Statements of Income
 (In 000s, except per share data)

| FYE December | 2014 | 2015 | 1Q16 | 2Q16 | 3Q16 | 4Q16 | 2016 | 1Q17 | 2Q17 | 3Q17 | 4Q17 | 2017 | 2018E |
|--------------------------------|------------|-----------|----------|----------|-----------|----------|-----------|----------|----------|-----------|-----------|----------|----------|
| | | | March | June | September | December | | March | June | September | December | | |
| Revenue | | | | | | | | | | | | | |
| Product sales | \$1,236 | \$2,701 | \$947 | \$1,028 | \$730 | \$818 | \$3,524 | \$735 | \$681 | \$730 | \$626 | \$2,772 | \$2,750 |
| Laboratory services | 479 | 121 | 129 | 30 | 23 | 47 | 229 | 16 | 16 | 9 | 1 | 42 | 50 |
| Collaboration revenue | 2,411 | 336 | 0 | 125 | 6 | 141 | 273 | 21 | 6 | 6 | 363 | 397 | 800 |
| Total revenue | \$4,126 | \$3,158 | \$1,077 | \$1,183 | \$760 | \$1,007 | \$4,026 | \$772 | \$703 | \$745 | \$991 | \$3,211 | \$3,600 |
| Expenses | | | | | | | | | | | | | |
| Cost of products sold | 426 | 1,180 | 439 | 431 | 400 | 389 | 1,659 | 425 | 393 | 448 | 347 | 1,613 | 1,510 |
| Cost of services | 326 | 368 | 316 | 161 | 52 | 103 | 631 | 100 | 79 | 49 | 292 | 520 | 0 |
| Research and development | 4,368 | 6,003 | 1,860 | 2,240 | 2,179 | 2,334 | 8,613 | 2,123 | 1,762 | 1,513 | 1,485 | 6,883 | 5,000 |
| General and administrative | 2,313 | 5,835 | 1,538 | 1,777 | 1,640 | 1,648 | 6,603 | 1,969 | 1,750 | 1,601 | 1,366 | 6,686 | 7,200 |
| Sales and marketing | 2,058 | 4,305 | 1,399 | 1,589 | 1,295 | 1,247 | 5,529 | 1,106 | 909 | 330 | 402 | 2,748 | 1,600 |
| Total operating expenses | 9,691 | 17,691 | 5,553 | 6,197 | 5,565 | 5,720 | 23,035 | 5,723 | 4,893 | 3,942 | 3,893 | 18,450 | 15,310 |
| Income (loss) from operations | (5,565) | (14,533) | (4,476) | (5,015) | (4,806) | (4,713) | (19,009) | (4,951) | (4,190) | (3,196) | (2,902) | (15,239) | (11,710) |
| Other income (expense) | (734) | (3,065) | (37) | (369) | (41) | (41) | (489) | (31) | (18) | (72) | (36) | (157) | (300) |
| Income (loss) before tax | (6,299) | (17,598) | (4,513) | (5,384) | (4,847) | (4,754) | (19,499) | (4,982) | (4,208) | (3,269) | (2,938) | (15,397) | (12,010) |
| Income tax benefit (expense) | | | | | | | | | | | | | |
| Net income (loss) | (6,299) | (17,598) | (4,513) | (5,384) | (4,847) | (4,754) | (19,499) | (4,982) | (4,208) | (3,269) | (2,938) | (15,397) | (12,010) |
| Basic income per share | (\$406.27) | (\$55.12) | (\$8.98) | (\$9.27) | (\$5.79) | (\$5.27) | (\$27.59) | (\$4.78) | (\$3.73) | (\$1.74) | (\$1.33) | (\$9.81) | (\$2.00) |
| Diluted income per share | (\$406.27) | (\$55.12) | (\$8.98) | (\$9.27) | (\$5.79) | (\$5.27) | (\$27.59) | (\$4.78) | (\$3.73) | (\$1.74) | (\$1.33) | (\$9.81) | (\$2.00) |
| Basic shares outstanding | 16 | 319 | 503 | 581 | 838 | 902 | 707 | 1,043 | 1,128 | 1,883 | 2,211 | 1,570 | 6,000 |
| Diluted shares outstanding | 16 | 319 | 503 | 581 | 838 | 902 | 707 | 1,043 | 1,128 | 1,883 | 2,211 | 1,570 | 6,000 |
| Key ratios: | | | | | | | | | | | | | |
| Revenue growth | | -23.5% | 128.0% | 215.3% | -22.5% | -24.3% | 27.5% | -28.3% | -40.5% | -1.9% | -1.6% | -20.2% | 12.1% |
| Product gross margin | 65.6% | 56.3% | 53.6% | 58.1% | 45.2% | 52.5% | 52.9% | 42.1% | 42.3% | 38.6% | 44.7% | 41.8% | 45.0% |
| Service gross margin | -9.9% | -205.0% | -143.9% | -443.3% | -124.9% | -119.4% | -175.8% | -522.4% | -396.9% | -441.6% | -31153.8% | -1140.1% | 138.9% |
| R&D/revenue | 105.9% | 190.1% | 172.8% | 189.4% | 286.8% | 231.9% | 214.0% | 275.0% | 250.6% | 203.1% | 149.9% | 214.4% | 138.9% |
| G & A/revenue | 56.1% | 184.8% | 142.9% | 150.2% | 215.9% | 163.7% | 164.0% | 255.2% | 248.9% | 214.8% | 137.9% | 208.2% | 200.0% |
| Sales/revenue | 49.9% | 136.3% | 130.0% | 134.3% | 170.4% | 123.9% | 137.3% | 143.3% | 129.3% | 44.3% | 40.6% | 85.6% | 44.4% |
| Tax Rate | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Deprec, amort & non-cash comp. | 2,277 | 4,200 | 250 | 600 | 450 | 425 | 1,725 | 400 | 400 | 450 | 500 | 1,750 | 2,000 |
| Cash Flow/share | (\$259.40) | (\$41.97) | (\$8.48) | (\$8.24) | (\$5.25) | (\$4.80) | (\$25.15) | (\$4.39) | (\$3.37) | (\$1.50) | (\$1.10) | (\$8.69) | (\$1.67) |
| EBITDA/share | (\$261.98) | (\$42.09) | (\$8.56) | (\$8.30) | (\$5.30) | (\$4.84) | (\$25.21) | (\$4.43) | (\$3.41) | (\$1.52) | (\$1.12) | (\$8.72) | (\$1.68) |

Balance Sheets

(\$000s)

| Assets: | 12/31/17 | 6/30/18 |
|-------------------------------------|----------|----------|
| Cash and equivalents | \$1,847 | \$7,429 |
| Accounts receivable, net | 810 | 516 |
| Inventory, net | 533 | 614 |
| Prepaid expenses & other | 312 | 525 |
| Total current | 3,502 | 9,085 |
| Property, plant & equip., net | 836 | 932 |
| Goodwill and intangible assets, net | 1,954 | 1,820 |
| Other noncurrent assets | 329 | 289 |
| TOTAL ASSETS | \$6,620 | \$12,127 |
| Liabilities: | | |
| Accounts payable | \$1,692 | \$1,283 |
| Accrued expenses | 1,908 | 2,246 |
| Deferred revenue | 24 | 14 |
| Short-term notes payable | 1,011 | 477 |
| Other | 155 | 248 |
| Total current | 4,790 | 4,268 |
| Note payable | 0 | 826 |
| Deferred rent and other long-term | 429 | 634 |
| Total liabilities | 5,219 | 5,728 |
| Stockholders' equity | 1,401 | 6,399 |
| TOTAL LIAB & EQ | \$6,620 | \$12,127 |

Quarterly Earnings Comparisons

| | March | June | September | December | Total |
|-------------------------------------|----------|---------|-----------|----------|----------|
| Revenues (in \$Mill) | | | | | |
| 2014 | | | | | \$4,126 |
| 2015 | 472 | 375 | 981 | 1,330 | 3,158 |
| 2016 | 1,077 | 1,183 | 760 | 1,007 | 4,026 |
| 2017 | 772 | 703 | 745 | 991 | 3,211 |
| 2018E | 846 | 789 | | | 3,600 |
| Earnings per Share (diluted) | | | | | |
| 2014 | | | | | (406.27) |
| 2015 | (140.18) | (21.05) | (9.52) | (9.43) | (55.12) |
| 2016 | (8.98) | (9.27) | (5.79) | (5.27) | (27.59) |
| 2017 | (4.78) | (3.73) | (1.74) | (1.33) | (9.81) |
| 2018E | (0.75) | (0.57) | | | (2.00) |

Source: Dawson James Securities, Inc. estimates; Company documents

Important Disclosures:

Price Chart:



Price target and ratings changes over the past 3 years:

Initiated – Buy - June 19, 2017 – Price Target \$2.00
 Updated – Buy – August 6, 2018 – Price Target \$3.20 (reverse stock split)

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- 2) **Neutral:** the analyst believes the price of the stock is fairly valued for the next 12-18 months;
- 3) **Sell:** the analyst believes the price of the stock will decline by at least 20% over the next 12-18 months and should be sold.

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| Ratings Distribution | Company Coverage | | Investment Banking | |
|----------------------------|------------------|-------------|--------------------|-------------|
| | # of Companies | % of Total | # of Companies | % of Totals |
| Market Outperform (Buy) | 23 | 88% | 7 | 30% |
| Market Perform (Neutral) | 3 | 12% | 0 | 0% |
| Market Underperform (Sell) | 0 | 0% | 0 | 0% |
| Total | 26 | 100% | 7 | 27% |

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